

THE NATIONAL COLLEGIATE TRACK COACHES ASSOCIATION

	Page
The High Jump.....	1
Proceedings	
The Discus Throw.....	14
of the	
The Quarter Mile Hurdles.....	24
Tenth Annual Meeting	
Factors Pertaining to Conditioning.....	26
: : :	
Business Meeting.....	32

Thursday, June 18, 1936

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University of Chicago

Chicago

ASSOCIATION OFFICERS 1936-37

F. P. Johnson, Drake.....	President
Frank Potts, Colorado.....	Vice-President
Ward Haylett, Kansas State.....	Secretary-Treasurer

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INDEX

	Page
The High Jump.....	1
The Discus Throw.....	14
The Quarter Mile Hurdles.....	24
Factors Pertaining to Conditioning.....	26
Business Meeting.....	52

MR. FRANK POTTS. This gives me a good opportunity to find out something about the high jump. I have never had one of these discussions before, but I believe I am at liberty to ask everybody in the meeting to talk about certain phases of high jumping.

There is one thing I believe, and that is that the fellows who made their high jump records, the record holders jumping without this new rule, (which permits any style of jump, providing the take-off is made from one foot) are going to see their records go pretty fast, because I believe the rule allowing the head to precede the feet is going to cause higher jumping. I believe it might even go so far as to say that a "dive" can be made higher than a jump.

MR. WINTERMAN. I would disagree with that. You remember at the time Osborne first started to get really good, the A. A. U. passed a strict rule which required that the head be over the feet. I think that very rule that made him so good.

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and are not straight over your foot. I do not see how you can possibly get the amount of spring that you should have. You do not have the chance of a direct drive.

MR. FICKELSCH. Then you believe I should have his feet directly under and not be leaning toward the bar in order to get the greatest amount of spring?

MR. POTTS. That is one essential in high jumping, but I don't think the take-off has so much to do with the style of jump the man uses.

QUESTION. Is that always true?

The opening session of the annual meeting of the National Collegiate Track Coaches Association, held at the Reynolds Club, University of Chicago, Chicago, Ill., June 18, 1936, convened at ten o'clock, Mr. John P. Nicholson, Vice President of the Association, in the chair.

CHAIRMAN NICHOLSON: Gentlemen of the Association, the first event we want to discuss this morning is the high jump. We shall have Mr. Frank Potts, of Colorado University, lead that discussion. Of course, after he has given you his version of the technique, it will be informal and according to custom, all of you will be able to ask questions or say whatever you like about the event.

THE HIGH JUMP

MR. FRANK POTTS: This gives me a good opportunity to find out something about the high jump. I have never led one of these discussions before, but I believe I am at liberty to ask everybody in the meeting to talk about certain phases of high jumping.

There is one thing I believe, and that is that the fellows who made their high jump records, the record holders jumping without this new rule, (which permits any style of jump, providing the take-off is made from one foot) are going to see their records go pretty fast, because I believe the rule allowing the head to precede the feet is going to cause higher jumping. I believe we might even go so far as to say that a "dive" can be made higher than a jump.

MR. TEMPLETON: I would disagree with that. You remember at the time Osborne first started to get really good, the A. A. U. passed those very strict rules which required that the feet precede the head, and it was that very rule that made him a great high jumper. Until then he was very sloppy on his take-off. He crossed over badly, leaving himself leaning toward the bar, and, as a consequence, he got very little spring. When he had to get his feet over first, it straightened him up on the take-off. You cannot get the head over the bar first unless you are leaning on the take-off, and if you are leaning and are not straight over your foot, I do not see how you can possibly get the amount of spring that you should have. You do not have the chance of a direct drive.

MR. NICHOLSON: Then you believe a man should have his foot directly under and not be leaning toward the bar in order to get the greatest amount of spring?

MR. POTTS: That is one essential in high jumping, but I don't think the take-off has so much to do with the style of jump the man uses.

QUESTION: Is that always true?

MR. TEMPLETON: I believe they fall down because they have a great tendency to lean. I think that was what prevented Jim Stewart (Southern California, 1931) from doing at least 6'9" or 6'10". The higher he got, the more he leaned on his take-off. He leaned toward the bar.

MR. POTTS: This boy, Cruter, who is doing our jumping, in high school jumped very much like Stewart. He jumped with the belly to the bar. I do not know what the name of it is. In high school this boy jumped around six feet, using that method, but he had to keep his head back because they would catch him for fouling. It bothered him an awful lot because he could not get his head over. Well, he came to college and the rule changed in his freshman year. It seems as though the weight of his head being over slightly, pulled the back leg over. It used to be they would get up on top with that barrel roll and straighten right out and then fall over. Now they seem to be turning on over.

Albritton uses something along this line as does Burke of Marquette. All three of those boys, Cruter, Albritton, and Burke, have all jumped over 6'8 7/8" this year. I believe the weight of the head allows that back leg to be pulled over without having to straighten out.

Here at this all-Negro meet (Chicago June 13) they got to talking about it. Cornelius Johnson said he never jumped with such a bunch as that. They were all colored boys and all were over six feet four. Maybe those long legs have a great deal to do with that form. It is rather an interesting situation, and I really believe the change is going to move high jumping up a little bit.

MR. TEMPLETON: Would you say that these men had their head over before they had their lead foot?

MR. POTTS: Yes, I think they would be called by the old rule.

MR. TEMPLETON: The old rule required only one foot.

MR. POTTS: That is right. It is not a dive, but the old rule would make this jumping illegal, because the head is just a little in advance of either foot.

MR. NICHOLSON: Don't you think the point of it is that it is taking off the inhibitions of the boy? He is not afraid now. He just goes ahead and jumps. I think what you bring out is very good, that they do have a tendency to lean in to the bar sometimes, but they are going to feel free now when they are jumping. For that reason they will jump higher.

On the other hand, personally, I believe some freak is going to come along in the next five or six years and jackknife over the bar and we are going to have to change

the rule back. That freak has to be a man who can come up and step off one foot, which is very, very hard to do. A man might run very slowly up to the bar and then stop and jump straight up in the air and jack-knife over and break all records. That is going to come, I believe. When I was in college there was a boy who could do about five feet two in the high jump. I jumped against him and then he did six feet one, diving off two feet. When you jump off two feet, you can stop quickly and go straight up. Some of these days I think a freak will come along who will make us go back to the old rule. I really believe that as long as you jump off one foot, normally speaking, there is no particular advantage in whether you dive or not.

MR. POTTS. There is another thing about the weight, when the jumper gathers for the jump. Some of these boys are running a semi-circle, coming in there and hitting it with their inside foot, of course, and swinging that leg around. It isn't a dive but it is just past the old rule. I know this boy of ours has quite a bit of trouble on that angle. Sometimes he gets off a little bit and gets to hitting it with his belly and then with his back arm. He feels that the angle that he comes in on to that bar has a great deal to do with it. He starts in front and then cuts in just before he gathers for the spring.

MR. NICHOLSON: What do you think about the different styles, say, the Eastern style, the Western or Roll, the Straddle jump, as you call it, or the Nelson (Butler 1932-3) jump that we have seen? Which do you think is the best form?

MR. POTTS. You find great jumpers who are using every form. Of course, we find freaks in everything, but I believe we have more freak high jumpers than in any other event. They tell me that boy Clint Larsen, from Brigham Young (1916-17) had probably the worst form and yet the most spring of anybody in the world.

MR. TEMPLETON. I always thought he had the best form of anyone I ever saw.

MR. POTTS: I never saw him jump.

MR. TEMPLETON. Theoretically, his form is the best that you can get.

QUESTION. That is the form that is going to be used when the world record is broken.

MR. TEMPLETON. He jumped a straight scissors with a complete layout on his back on top of the bar. He kept his direction over the bar the same as his run, and then after he had cleared the bar he took a roll to prevent himself from hitting on his back.

MR. POTTS. Similar to Burt Nelson's style? (Nelson started his jump as if to scissors over the bar, taking off from the right foot. Over the bar, flat, with his back

to the ground, he pulled down with his left foot, going into a roll that landed him in the pit on his left foot and hand.-Ed.)

Rushforth, of Utah, won the Junior A.A.U. last year and jumped close to 6'6". We called it a Half-Sweeney. He runs almost from the front throwing his front foot over the bar and then pulls it down to lift his center of gravity up and then tucks this other leg under and goes over with his back to the bar.

MR. TEMPLETON. Larson went over exactly on his back. He did not start his turn until he was past the bar. Then he turned away from the bar, not back toward it.

MR. NICHOLSON. That would be the same thing that Nelson uses, except that Nelson ran from an angle and did practically the same thing.

MR. TEMPLETON. Larson ran at a forty-five degree angle.

QUESTION. The picture I do not get is the relative position of the body with regard to the bar. Is it parallel to the bar or across the bar?

MR. TEMPLETON. Exactly the same direction he is running. He is running at practically forty-five degrees. To get up terrific speed, he takes a long run and runs as fast as he can go.

QUESTION. Does he keep his legs straight?

MR. TEMPLETON. Just like a scissors jump. The difficulty with that jump is that there is a very great tendency to start your layout before you get off the ground and also lean with your head toward the bar to start that turn. The turn has nothing to do with the form, as Larson used it. The turn was merely to protect himself so that he would not land on his back.

QUESTION. That is awfully hard on a fellow. I have seen two or three jumpers use that.

MR. TEMPLETON. If they get it right it is not.

QUESTION. It strains their back all the time.

MR. NICHOLSON. You have to get that tail up.

QUESTION. The advantage is that you get your feet and hips over first, and then they go into their roll.

MR. TEMPLETON. I think there is a very great advantage in any scissors jumping because you are jumping from an outside foot. That is the natural thing to do. It is an unnatural thing to jump from your inside foot because you fight the bar, and in fighting the bar you cross over on your last steps, running in that semi-circle you are speaking of, and that semi-circle is what throws the body leaning toward the bar.

MR. NICHOLSON. Take, for instance, the Nelson jump or the Larson jump, where you must kick very hard with the opposite foot after you spring.

MR. TEMPLETON. I do not believe you do. The feet go up there perfectly naturally.

MR. NICHOLSON: Take the straddle jump. It seems that is one jump in which you cannot kick too much, because you do not seem to be able to get down properly if you do.

MR. TEMPLETON: If you kick too much in the straddle jump, you throw your hip down on the bar.

MR. NICHOLSON: On the other hand, you are giving a concave surface to the bar in the straddle jump. You lose there by the fact that your spring is hurt some. What do you think of the straddle jump?

MR. TEMPLETON: It does not necessarily ruin the spring but it has a tendency to do so. I think these colored boys naturally spring well. They do not have to learn to stay over their foot and spring right. They can probably use it better than the white boys who are more or less manufactured jumpers. But I do not see how under any circumstance they can get better results than they can out of the Western form as it is used by Marty (Fresno State) for instance. He is not using it well this year. I am referring to the time when he used it well. As he clears the bar he stays in the jack-knife position. His take-off leg, his right leg, clears the bar, that is, his knee does, while he is on his side. It gets over the bar and then he turns and his hip comes up. If he straightened out at all, that hip would come right down back to the bar, but as it is, the natural turn which he makes in the air brings the hip right on up over the bar. It does not come close.

QUESTION: There is no violent attempt to jerk?

MR. TEMPLETON: No. If there is, it will completely ruin it. Osborne (Illinois 1920-22), for instance, could jump either way, although generally he took the style in which he jerked. He took a complete lay-out and cleared on his back. There is one great disadvantage to that style of jumping, and that is that it requires a much better take-off. You will take off invariably with your foot well out in front of you from that jump. Osborne made a great mistake in the '28 Olympic Games by attempting to use that jump on the soft take-off over in Amsterdam when he could do the other form just as well. You have a feeling that you are loafing when you use the other form. You get up there and all you have to do is fall, and when you are jumping that height, which is above what you generally jump, you decide you have to do something extra and you kick that leg out and it jerks the hip right down to the bar.

MR. POTTS: The jumper who used other forms has his troubles also when over the bar. The straddle jumper must start his turn and layout from the take-off because he is in no position for a jerk or twist or even a pull with the leading leg after he gets over the bar. In the

Nelson form he has the leading leg in a position for a down pull for elevating his center of gravity and starting his turn away from the bar very much the same as in the Eastern.

I have had a very interesting time the past two years watching (I mean watching) these two forms. We have had a fair jumper using each form. Both seem good form although unorthodox.

In the belly roll the jumper gets his head over first, that is, along with the front foot. He runs up sideways and plants the left and kicks the right foot high. When over the bar, I would say that the head is just a little bit ahead of the front foot. After he gets over and is straddling the bar, there is nothing for him to pull with. If he tries to pull with the front foot, it throws him right through the bar. He actually starts his roll from his take-off, with his speed taking him past the bar. In this other style he gets a pull that throws his center of gravity up after he is in the air. That seems to me to be the greatest difference in the two jumps. By taking off on the outside foot, he is able to pull down with the other to throw his center of gravity up.

MR. NICHOLSON. Do you believe, then, that you get anything out of the kick with the lead leg? After you spring and get a good kick, do you get anything out of it?

MR. POTTS. In the belly roll, I believe he gets something from the up kick but not otherwise.

MR. NICHOLSON. In the belly roll I do not see how you can because you can not get the leg down, but in the Nelson jump if you spring and then kick, do you believe you get something out of the kick?

MR. POTTS. That is the way you get your lay-out actually. That is what throws you into a lay-out--the fact that you kick it up and pull it down. It throws you into your arch right over the bar.

MR. NICHOLSON. Is anything added by that kick in actually lifting the center of gravity?

QUESTION: I think you get more out of the Eastern style than you do in the straight scissors.

I do not think most of the jumpers are conscious of getting that force from kicking the leading leg down. I think most of them are conscious of arching the back rather than pulling down with the leg. I think the pulling down of the leg is the result of trying to arch the back.

MR. POTTS. On the straight Eastern form, as they throw that leg up and then pull it down, do you not think they pull it down to elevate the center of gravity?

MR. TEMPLETON. That is not the leading leg that they snap down, it is the take-off leg.

MR. POTTS: The take-off leg is pulled down to land on. Before that however, the leading leg is pulled down to lift the center of gravity which is the most important thing in this type of jump, I think.

MR. TEMPLETON: But the lead leg does not throw down. It comes down naturally from the reflex. I have seen men that I really thought got a lift, Richardson, for instance. All of these fellows who come along nowadays who are so good get the lift right on the take-off. Would you agree that ninety-five per cent of high jumping is in the take-off and getting into the air, and that perhaps five per cent is in assuming a certain position which might gain you an inch or two? Your take-off means feet, the position you assume in the air means inches at the most.

MR. POTTS: I do not think there is any question about that. I think probably too much time is spent trying to act in the air instead of getting a spring. However, a jumper should have a mental picture of what he should do to get the best results.

MR. TEMPLETON: I imagine Cornelius Johnson could probably broad jump 6'6".

MR. POTTS: I have never seen a man who took off so far from the bar and go so far and so high. Is he coming up closer? I saw him a couple of years ago. It seemed to me he was taking off much farther away than any of the other good jumpers.

QUESTION: That was two years ago. He has been close ever since.

MR. TEMPLETON: There is not much in his form that you could change.

MR. NICHOLSON: Is there any more discussion on the high jump?

MR. THOMAS SMITH: We had a boy who was using that Eastern take-off, the scissors take-off with the outward roll. Nelson was there and watched him, and he said that one of the important things was hooking that take-off leg back under the bar as he was over the bar, because it toppled him then and caused him to rock over the bar. He added about two inches to his height.

QUESTION: There is one jumper who brings his take-off foot below the bar as he goes over. His foot is a foot and a half below the bar at one time in the jump. He slaps it down so he is as flat on his back as he can be, when he has crossed the bar with his body, and then he throws it up over. He is a little fellow--about five feet ten.

MR. NICHOLSON: Mr. Potts, do you think, then, there is anything to the high jump outside of the spring and the lay-out?

MR. POTTS: Yes, the approach and gather are very important and if neglected cause poor take-offs.

MR. TEMPLETON: I believe there is a possibility of

a lift in the air, but I think it is more or less natural with certain jumpers. If a fellow does not have the timing to get a lift with his lead leg or take-off leg, it would be very difficult to teach it to him.

MR. POTTS: Here is something that might be interesting along that line. All winter Cruter spent part of his time kicking in the corrective training room. He had a rope there. He went in and kicked at that thing every afternoon. He got so that he could kick over eight feet high without leaving the floor. He seemed to think that helped him an awful lot. He improved from 6:3 to 6:8 $\frac{1}{2}$ in no time, so to speak. He said that he thought that practice, kicking at that rope, helped him. I believe it was psychological. I believe he was not afraid of height after getting to the place where he could kick that high. It might have been psychological and it might have been mechanical.

QUESTION: Mr. Templeton made the point a moment ago that high jumping depended on poise of the body over the spring foot. That is what Cruter was doing when he was kicking at the rope. He was learning to control that spring foot poise. Maybe that is where the value lay, not in the kicking itself but because of the necessity of being poised on that foot. What do you think? Would kicking help in that direction?

MR. TEMPLETON: I do not think it would help him. At the Fresno Relays this year they had five men who cleared 6:6--Johnson, Marty, Watson, Thurber, and Smith. Not one of those fellows had any kind of swing-up with the lead foot. As a matter of fact, every one of them almost tipped the bar with his lead foot.

MR. CROMWELL: I think a great deal depends upon the speed at which you approach the bar. Of course, we all know that converting that speed in an upward lift is the answer in high jumping. We had a meet with Ohio State University last Saturday. I watched Albritton very carefully. He does this Jim Stewart roll (straddling the bar). I call it the barrel roll because I do not want to compliment Stewart so much. He goes over with his stomach to the bar. His lead leg and his head are almost exactly a tie as they pass the bar. Where he gets the added benefit in the barrel roll, and the reason I think the world's record is going to be broken with that, is the fact that the action of the body and the head, a downward thrust, lets that back leg come up over the bar so that you do not pull the bar off with the trailing leg. There is no kick to that trailing leg at all. It is a swing, and it is swung from the hip. You positively do not kick with it. That is why a boy who is inclined to be tense cannot use that form at all. It can be used only

(Chicago) put out a shoe for us to try. We liked it very by one thoroughly relaxed, and therefore it is adapted to the easy-going colored race.

Albritton gets more speed into the barrel roll than anyone I have seen using it. That is why he is jumping higher than any of the others using that form. It is remarkable the amount of speed he can put in the approach and get up in the air. He can get his take-off close to the bar and get right straight up in the air. Primarily, that is a slow approach jump. Anyone speeding into it has spoiled his jump right then, but Albritton does it.

Any of these boys who can jump six, eight, or ten inches higher than their head are good high jumpers. That is why Clint Larson, of Brigham Young University, is the greatest jumper I ever saw, approaching the bar with tremendous speed, driving straight up in the air, and going over the bar with his body perfectly flat with the cross bar and flat on his back. To my mind, it is the ideal high jump. I have been trying to teach it for years. To show that I am a swell track coach, I have never had a man who has come within any distance of doing it. I am thoroughly convinced now that I know nothing about coaching.

MR. NICHOLSON: How much higher than his head did he go?

MR. CROIMELL: He was five feet ten and Eugene Roberts said he saw him clear 6:10.

MR. TEMPLETON: They said he jumped seven feet every day for two weeks down at Kelly Field!

QUESTION: I had Clint Larson for one season in one of the service leagues. I did not coach him, I let him jump. When they can jump, let them jump!

MR. TEMPLETON: We have Burt Carrigan out on the Coast. Burt is five feet six. He jumps six feet.

MR. POTTS: I would like to get another angle on the matter of shoes. I notice some fellows get down as flat as they can on their heel by not using any spikes at all--using sprint spikes, in other words. Then I have seen other great jumpers using pretty thick two-spike heels with a thick piece of leather and sponge rubber in the heel. I do not think there is any question but that the protection of the heel spike and sponge is great. Don't you get more leverage however, without any heel spike or anything else in your shoe than you get with that?

These African boys jump eight feet taking off from termite mounds. They hit on their feet, heels down pretty low. I wondered if it is not a fact that the lower you can get down on the heel, the more spring you can get.

MR. NICHOLSON: Your ideal is no heel and a very thick sole.

MR. POTTS: That is the idea.

MR. HILL: One of the sporting goods (Witchell-Shiell, (spring and swing) go right in there together and the kid can really jump.

Chicago) put out a shoe for us to try. We liked it very much. They took off the two back spikes of the jumping shoe and put a leather cleat across the full width of the sole, similar to the old football cleat before we used the spiral or rectangular cleats.

QUESTION: It must have cut up the track.

QUESTION: No, it did not bother at all.

MR. NICHOLSON: What did your jumper think about it?

QUESTION: He liked it very much.

MR. CROMWELL: Of what material was the cleat made?

QUESTION: It was a leather cleat, very much like an old football cleat, except it was longer.

MR. POTTS: Walter Marty uses very short spikes, both heel and toe.

MR. TEMPLETON: It depends upon the take-off.

MR. POTTS: I noticed him in Lincoln two years ago and he had heel spikes on but they looked very short.

MR. TEMPLETON: I think he uses regular sprint spikes. There is only one disadvantage to using sprint spikes, and that is that a fellow who gets accustomed to them cannot, when he runs into a muddy take-off, change to heel spikes. A little extra weight just ruins him, he cannot use them. On the other hand, those heel spikes are dangerous. Clint Larson, at a service meet, cut a tendon clear across. He was badly crippled.

MR. POTTS: When using those sprint spikes, when a fellow hits the take-off, he bruises the heel. He cannot use them very much, I would say.

MR. TEMPLETON: The heel toughens up. Also, you can pad it fairly well from the inside.

MR. POTTS: Do you like the sprint spikes for high jumpers?

MR. TEMPLETON: Yes, I do, except if you get a muddy take-off they are just out of luck.

MR. NICHOLSON: I saw a high school boy at Fort Wayne this year. He was about five feet nine tall. He jumped six feet two and refuses to use shoes at all.

MR. TEMPLETON: What I think is a matter of form is a sophomore in high school in Palo Alto who has just about the nicest high jumping form of anyone I have ever seen. He appears to be a little too short. He will probably be very muscular in the upper parts of his body. I do not know whether he will be a top-notch, but as a top-notch in high school he is jumping 6:5. He uses the western form, but he gets very much of a jack-knife, and he has a beautiful swing-up with that lead leg. If it were not for that kid, I would be inclined to doubt that anybody could get any use out of it at all. In practice, when he is not keyed up at all, it appeared that that lead leg threw him clear off balance, and he loses his spring because he is not over the foot. When he gets in a meet and is really steamed up, the two (spring and swing) go right in there together and the kid can really jump.

MR. NICHOLSON: I think we have had enough on the high jump. Is there anything extra?

QUESTION: Let me ask a question about the Eastern form. How straight do you ask your jumpers to stay with their leg during the swing-out?

MR. POTTS: Well, the boys I have worked with on that form have been scissors jumpers, to start with, and they gradually got away from that. They run a little more from the front and take off pretty much the same as in their old scissors jump. If he is a pretty fair scissors jumper, he is able to go to the eastern much better than the western.

QUESTION: You can swing your leg up flexed, or you can swing it up almost straight. How do I take this leg up?

MR. TEMPLETON: A natural swing up.

MR. POTTS: Swing it up almost straight?

QUESTION: I believe you get a tremendous lift, especially for a heavy man, with that swing-up leg in the Eastern style.

QUESTION: I think Philson (Drake '36) has the finest style I have seen. He puts that swinging leg out over the bar and this one follows and he comes down as simple as falling off a log.

MR. NICHOLSON: Mr. Potts, how many times a week do you think it is best to jump?

MR. POTTS: I let the Varsity men jump Wednesday quite a bit lower than they are capable of jumping, and they jump on Saturday afternoon for height. That is the only time in the week that they jump for height. The tendency is for the boy to want to jump for height too often. I find it hard to wait for Saturday's meet to see just how high they can go.

MR. NICHOLSON: Do you jump on Monday at all?

MR. POTTS: No, just running around, loosening up exercising.

MR. NICHOLSON: Say a man is good for six feet four. Do you allow him to jump six feet two on Wednesday?

MR. POTTS: Never higher than that. He does lots of kicking and running and exercising. During the winter season I think jumping is all right, but during the season when you expect your men to really do their best on Saturday, it is better for them not to jump for height during the week. Once a week is really all a fellow can take for height.

MR. NICHOLSON: The men out on the coast have better weather and longer time in which to experiment.

MR. TEMPLETON: You can have it. This is the first time I have been warm in two years.

MR. NICHOLSON: What is your reaction to jumping, on Wednesday and Saturday or Tuesday and Saturday, or what? We know the boys will differ.

MR. TEMPLETON: I do not think you can establish such a system. It depends upon how good your man is. Mr. Potts has a fellow who jumps 6.8 $\frac{1}{2}$, and he does not have to jump all the time, but if you have a fellow who is lucky to do six feet, you had better jump him every day of the week until your regular season starts and maybe you will develop some habits of form that will stick with him in competition.

I have always felt that a jumper who was ready to go should have a week of complete rest from jumping. Then you will find fellows who cannot stand a rest. Their nervous systems will not stand it. They go crazy thinking about it. They say, "How do I know I am not going to miss completely? How am I going to get off the ground? What am I going to do with my arm and my leg?" They analyze the thing until they go crazy.

MR. POTTS: Then in the preliminary season, jumping is the way to learn to jump. I think Freshmen have to learn to jump. They learn to jump by jumping and by preliminary season work. In a warm climate or a field house, I think jumping is the way to get everything worked out.

MR. TEMPLETON: It does not do any good if you have fellows who can not jump. They can go all the way through school and still not be able to jump if they do not have it in them.

MR. NICHOLSON: Is there anything additional?

MR. POTTS: What is the difference between board track jumping and indoor clay jumping?

MR. TEMPLETON: Marty says there is no difference between any of them.

MR. POTTS: We have never had a jumper on a board take-off. I just wondered if it is better.

QUESTION: It is better.

MR. POTTS: They set that indoor record at 6.8 15/16.

QUESTION: There are no holes worn in the floor.

MR. NICHOLSON: Get on needle spikes and you can jump like the dickens, but if you get a good outdoor take-off, it is pretty hard to beat, because there is something about Mother Earth that gives you a little bit more, I think.

MR. POTTS: Marty's outdoor record is the best that has been made, but the next best marks that have been made were made by those two colored boys in New York last February. I was wondering whether it was the form they were using or whether it was a better take-off on that board than on a hard clay take-off that was in perfect condition.

MR. CROVELL: After a long, hard day's competition, when the highest heights are reached, if a boy has been taking off from the same spot every time with his jumping foot, that clay is usually pretty well worn just when he does not want it worn at all. That was the way it was

MR. NICHOLSON. Thank you Mr. Potts for leading us on the High Jump.

last Saturday, for instance. The boys thought they had cleared six feet eight inches. When they measured it, it was six feet seven and one-half inches. Every one of those boys had a hole worn where he was putting his foot down on that take-off. If they had had a nice board with no holes or anything to bother them, they probably would have gone over.

QUESTION: Spitz, of New York University, could always jump better indoors than outdoors.

QUESTION: Aren't we all wrong on our take-off material in high jumping and broad jumping? Broad jumping has a board, but is it not going to be necessary for us some day to develop a material that will not give spring but will give absolute security, sure footing, and not make a depression eventful for your high jumping and your pole vaulting and all those events? We are going to have to do that for out-of-doors. There is some kind of composition that we should discover soon that would not give spring but would give security and fine footing.

MR. NICHOLSON: In the Kansas City Athletic Club they had these floor joists pretty far apart. There was an absolute spring to a board in that case. We are going to have to make rules on that some of these days, because I believe some of these indoor jumpers, the way they are jumping on these false floors, are getting something that is not coming to them.

QUESTION: We are talking about the mechanics of it, but there is a physiological angle to it, too. I think a man can compete longer outdoors. He refreshes more quickly in the sun and the wind than he does indoors. I believe when they get to the great heights, the outdoor jumper has a little bit more left than the indoor jumper.

MR. NICHOLSON: My own feeling about the thing is this. I really believe they ought to do their medium jumping on an opposite take-off and when they get to the bar for the height, bring them to a new one.

MR. TEMPLETON: On a strange take-off?

MR. NICHOLSON: There is a psychological effect there.

QUESTION: If you had the same material in both, you would be absolutely all right.

MR. TEMPLETON: You have different surroundings. You are looking into different bleachers. They ruined the broad jump in the 1928 Olympic Games, and in Los Angeles, for instance, after they moved the broad jump over, only one man got a fair jump out of nineteen. It will not work out.

MR. POTTS: Mr. Chairman, we have spent too much time already on the high jump so I'll turn the discussion back to you.

At all, I have known that coaches who insisted on a whiff in which the left foot did not leave the ground until the right foot touched the ground. In other words, there is no drive at all.

MR. NICHOLSON. Thank you Mr. Potts for leading us on the High Jump.

MR. Templeton, we would like to have you talk about the discus now.

DISCUS THROWING

MR. TEMPLETON. The discus is one of those events that appears to be very simple, but as soon as a fellow starts his whirl, he goes into a tailspin, and very few of them analyze it enough to know exactly what they are doing, what direction they are going, or anything else. It is very much the same as if you put a fellow to be examined for aviation in the whirl chair and whirl him around and then ask him how many times he went around before he fell out of the chair. As a matter of fact, I do not believe one out of ten of the discus throwers in college competition could give you a diagram showing you the simple steps he takes as he goes across the circle. They simply are not concerned with it.

Few of them have worked enough on shadow throwing. They feel silly if they are caught shadow throwing. Shadow throwing has only a certain amount of value because of the fact that they do not have the discus. They know they are not throwing, and they can become absolutely perfect at it and still not be able to throw the discus. However, it is of tremendous importance to a discus thrower to know exactly where he is in every part of that simple turn, and it is a simple turn, just as it is important for a flyer to know exactly where he is in every part of a tailspin.

Some of the ideas about discus throwing are very silly. I read a fiction story about a month ago in some magazine, the name of which I have forgotten, about a discus thrower. None of the other boys would speak to him because all he did was throw the discus. Then in the big meet he wound up and took his first turn, getting up speed. Then he took his second turn. He was going at a terrific pace. By the time he took his third turn he was going so fast the eye could hardly follow him, and when he let go, the discus went for a record. It is simply an illustration of how ridiculous are the ideas of some people on the subject.

As a matter of fact, there is only one turn, and in making that turn I have always felt the whole problem was in getting the amount of whirl just right and the amount of hop just right. We have had two schools of discus throwing ever since I can remember. There are some who have taught that you hop all the way around. I have actually known coaches who used a small hurdle a foot or a foot and a half high, over which the throwers had to hop on the first part of the turn, which made it impossible to whirl at all. I have known other coaches who insisted on a whirl in which the left foot did not leave the ground until the right foot touched the ground. In other words, there is no drive at all.

My men have always exaggerated that hop. Of course, the more hop you can get inside of an eight foot two inch circle without going up in the air, the farther you will be able to throw the discus, but, after all, you are limited by the circle. The man who insists that they should simply whirl will never have any difficulty about fouling, but, at the same time, he loses too much. Therefore, you have a condition where you have to discover how much whirl and how much hop, and under every circumstance that start of the turn must be a whirl.

In making that whirl, the action should come from the legs and not from the shoulders. In other words, the left shoulder should actually ride loose instead of throwing the body around. If the man throws his left shoulder in order to make that turn, it is inevitable that he will land in throwing position with his hips following his shoulders. There you come to the actual secret of throwing or hitting in almost any sport. The action of the hips differs considerably in all sports.

For instance, in the shot put your hip action has to be slower than in any other sport. You actually have to keep your hips behind that shot all the way through, because the shot is not traveling fast and it is very heavy. Your hips, which actually control the main part of the weight of your body, must be behind that shot or you are simply out of luck. In other words, if you go up with the hop in the shot put and your hips are turned forward, it is impossible to get behind the shot. It takes out almost all of the force of the body and you have very little left except the motion of your arm with which to put the shot.

Take the other extreme, which is throwing the hammer. Although I have never coached the hammer, it is perfectly obvious that that hammer is traveling very fast after you take your preliminary whirls and the two or three turns. (Maybe that is where that author got his ideas about the discus.) The hammer is on the end of a four-foot wire and it is heavy. You must start your hips well ahead of the hammer, and they must stay ahead of that hammer all the way, because if the hammer catches up to your hips, you will actually throw the hammer before you can get any hip action into it. You see these fellows letting it go over their shoulder. They have let the hammer catch up with their hips some place, maybe at the start, maybe sometime during their turns. There you have, I believe, the two extremes.

In the discus you have just about half way between that. You have a turn, and you get up a certain amount of speed. The discus is not terribly heavy, and it hangs far out on a loose sling, which is your arm. Therefore, you must have your hips in position when you actually

come into throwing position, but your hips must start first. They must start before any other part of the throw. It is a very quick action. It is comparable to the golf swing, more so than anything else I can think of.

For years, and, in fact, until very recently, all golf pros said that the swing of a golf club meant you had to keep your hips behind the club, and still when you watch them, you see they start their swing with their hips first. I used to argue my head off with them, and all of them followed the old rules that had been laid down when the game began, and it was not until they actually got slow movies of Bobby Jones that they were shown the left heel was going back on the ground before the actual finish of the golf swing. That meant the hips had started through before the down swing. In other words, the start of the swing was with the hips.

A golf club, of course, is out there quite a bit farther than the discus in your arm. The weight of the discus, however, is so much greater than the weight of the club head that I believe they just about make up the same speed and the same action that you should have with your hips. It is a difficult thing to actually see, because in watching a man, you must be absolutely sure he lands in throwing position with his hips in position, but also that he does not follow the throw around with his hips, but starts with his hips first, shooting through, which gives a terrific impetus and an easy impetus to the discus making a very easy throw the rest of the way with the arm.

I do not know whether you fellows noticed Fotherth or Lyman, both of whom worked hard in the discus and never amounted to an awful lot. They both got up around 154, or so, as their absolute best. It was completely due to the fact that they had slow hip action, which followed the discus, rather than shooting through and getting a start.

MR. NICHOLSON. It is almost impossible to make a man put the shot and throw the discus well at the same time and make a record.

MR. TEMPLETON: I do not believe that is entirely true, because it is so seldom that you find men like Fotherth and Lyman who do have that natural slow hip action. Take this boy, Reynolds. He has a hip action that is much too fast to be a high-class shot putter. He has been trying his best to slow it down. He should be a great discus thrower because he does have exactly the hip action for it. He does not like the discus, however, he does like the shot. So he will not throw the discus. He says that makes him all the faster with his hip action, and he is quite right, as long as he is trying to make a shot putter out of himself, the discus will simply do him damage on account of the extra speed of his hip action.

MR. NICHOLSON: Do you know about Dunn's hip action?

MR. TEMPLETON. Dunn's hip action is just in between.

He should be just as good a shot putter as a discus thrower. He is not particularly slow, he is not particularly fast. He has not done the really hard work necessary for the shot put. For instance, he said he had a weak knee and did not want to get down low on it. If you cannot go down on your knee, you cannot learn to put the shot right. He never did. On the other hand, it is the opposite knee in the discus that he goes down on. Still he will

MR. NICHOLSON. What do you think about reversing and not reversing in the discus?

MR. TEMPLETON. Reversing is a very important thing, I believe, when it is done right. It adds quite a bit, simply because it allows you to go through with your natural throw. However, one hundred per cent of the discus throwers have a tendency, which can very easily become a serious fault, to reverse too soon. If they do reverse too soon, it simply means they are not anchored to anything and cannot possibly get any leg drive, in which case it is very serious. As soon as you notice a man reversing a little bit too soon, or even if you are just in doubt as to whether he is or not, make him stop reversing. You will find at first he simply cannot throw unless he pulls himself clear out of the circle, trying to hold his feet there. Then when he finally gets so that he can throw without a reverse, that means he is getting drive off that right leg and then he can go back to the reverse.

I believe your finish without a reverse at all is very sloppy, and it does not allow you to go through with everything you have in the throw. It is not the reverse itself. The reverse comes after the discus has actually left your hand. The fact that you are going to reverse makes every part of your throw smoother and allows you to go through with that.

MR. NICHOLSON. Do you not think that if a man anchors that left foot enough to get a really good pull, it will have a tendency not to allow him to reverse?

MR. TEMPLETON. Not at all. I think the more you have that left foot anchored, the more is the tendency to swing that right foot off the ground.

MR. NICHOLSON. It has a tendency to stop the reverse-- I mean the full reverse, such as we have in the shot.

MR. TEMPLETON. You can anchor that left foot and work out a form in which you do not reverse but pivot all the way around with your right foot coming over and your left foot not doing a thing but turning. I have tried that a number of times, thinking that that would be much better than a reverse. Maybe it would be at that, except for the fact that it has more of a tendency to make you lift the right foot faster than the actual reverse does. You have the feeling that you are solid on that left foot and you just swing that right foot up very fast and come around. However, there are many men who will never get that reverse to the place where they can count on it, and you are

much better off if you throw them without a reverse.

MR. NICHOLSON. Not reversing is the lesser of the two evils then?

MR. TEMPLETON. Yes, I believe Dunn, for instance, could not regularly throw with a reverse. Within a very short time he would go right back into the old habit. He has practically given it up for good. Still he will go out and reverse once in a while and be very much better.

There is one thing, I believe, that is important about the actual start. I believe these Europeans, whether they ran into it by accident or whether they actually know something, have really got well ahead of us. That is the wind-up before the start of the whirl. In throwing the discus naturally the groove that you throw in is a natural one. You cannot change your groove. You cannot just make your arm go up or down. It goes in a natural place.

In order for the line of flight to be right, you have to be in a certain position, and in order to get that position, you have to be down fairly low. It is not bending over with the body that counts in getting low at all; it is the bend that you get on the left knee as you start your whirl. In bending down on the left knee as you whirl, practically everyone has the feeling that he must also bend way over with his body. That is completely wrong. It does two things, it gives you a feeling that you are down low when you are not. You will straighten up just as soon as you start to whirl anyway. Another thing. It takes all of the tension out of your body.

In going "back" with the discus, if you do it correctly, you could wind your body up very tight so that you have a natural reaction starting into that whirl. It gives you a much smoother whirl and a much faster whirl without trying to make it fast, and you will have less difficulty getting to the place you should be before you take off with the hop, and all of the time you are in the whirl, getting into throwing position, you will have that tension up the right side of your body. Nick, will you stand? Now straighten your body from the hips up. Now get your shoulders back a little bit. Now wind up until your right side is tight. Now do you feel the tension there? From there you can start that whirl very easily, and it is just like unwinding. You can go as fast as you wish. With the feeling of tension up that right side, you can leave your arm just like a sling.

MR. NICHOLSON. Your start is more straight up. This is about the bend of the knee. (Illustrating half-bend)

MR. TEMPLETON. It is the left knee that counts, not the right. You can take a much longer whirl with this wind-up. You get a longer pivot on that and get more speed, but you are starting easily and you are not having to drive off your right foot particularly in order to do it.

terribly, and he was working hard, but he did not know

It is just the unwinding.

The thing I was trying to get over was this point of getting your wind-up at the start, a backward pivot, something which has never been considered of importance. Get it so that it actually starts you on a good, fast whirl without any effort on your part.

MR. JOHNSON. You mean a backward step when you say a backward pivot?

MR. TEMPLETON. Your backward pivot is the very first position. You pivot around in order to start.

QUESTION: Do you want to go forward now to your stance after you land, ready to throw? You said you wanted your hips ahead. What is your position there?

MR. TEMPLETON. Your hips must land in position to throw, well placed. They must go through at the start of the throw. It does not do to throw this way with the hips just following around after the discus.

One of the greatest faults the discus throwers have is a feeling they have after they have completed their turn. They land of course, on their right foot after the hop; the left foot is up in the air but is coming down. They do not want to let that come down naturally. They feel they have to get something extra by cocking that discus. While they are doing it, they are getting the discus out of position to throw. It is not in the groove any more. In addition to that, the left foot is hanging up in the air, and as it hangs up in the air the hips go through, and they are through and open before the throw is actually started. So by that one little thing, they ruin everything they have done beforehand.

MR. NICHOLSON: Do you not think going across the circle in a fairly straight line is important in order to get balance?

MR. TEMPLETON. But it is a very difficult thing for them to learn that until they have the feeling and know where they are, all the way through.

MR. NICHOLSON. Don't you think that will teach them where they are if you teach them to go across the circle straight?

MR. TEMPLETON. They have to check up on it each time they go across. You have to do a great deal of shadow work, and they hate to do it. They are afraid somebody will come out and see them and think they are a pansy.

MR. NICHOLSON: At the Nationals last year I watched Levy. His foot work was quite unorthodox inasmuch as he would come clear around over here (to left) with his right foot.

MR. TEMPLETON. I did not see him, but that is explanation enough for his terrible showing right there. That is off the idea of the straight line. He was throwing terribly, and he was working hard, but he did not know

what was the matter. His tendency has been to whirl too much.

MR. POTTS: One of the reasons for not getting that weight forward is so that you can land on the balls of your feet, isn't it?

MR. TEMPLETON: Yes.

MR. NICHOLSON: You want to be as close to your heels as possible.

MR. TEMPLETON: Another thing, when you are trying to get an even balance between your whirl and your hop or drive, as you step out in your first position, that foot is not perfectly under you. However, if I were perfectly on balance, whirling here, and then tried to hop, I would just go up in the air. My momentum would be up in the air and down. But because of the fact that you are slightly off balance forward when you take off in that hop, your momentum stays all the way directly across, not up and down, but right into the discus. You stay very much closer to the ground. You are bound to. You cannot help it. However, at the same time, you have to be very careful you do not jump right out of the ring.

MR. NICHOLSON: You mean as your weight is forward, you start your pivot.

MR. TEMPLETON: As you get half way around, your center of gravity has gone a corresponding amount over to the other side, which leaves you off balance. In other words, if you did not hop at all but continued to try to whirl that way, you would fall right on your face.

QUESTION: Are your feet approximately parallel to the line of flight as you deliver the discus?

MR. TEMPLETON: Your left foot or your pivot position with your left foot and your right foot and then your left foot where it lands, should be approximately in a straight line, although the left foot as it lands may be a little bit over to the left. However, if your right goes around too far (to left) and you have to make up for it with your left being over to the right, then your stance is so close it is practically impossible to get any hip action into it at all.

MR. POTTS: I should like to ask you a question about the groove of the discus. Does your discus start off and then come up and then go down again. In other words, it starts low and comes up then down again before throwing. In our conference we have three men close to 160 feet and they all carry the discus low all the way around in the turn. I have seen good discus throwers have an up and down groove.

MR. TEMPLETON: That is the bunk. That generally comes from what I call cocking the discus and attempting to get an extra punch in it after you should have landed. They will throw it before they get through. Damm is certainly not a master at form or control, was he throw 176-6 last year.

MR. POTTS: You carry it pretty level all the way around?

MR. TEMPLETON: Yes. Eric Krenz (Stanford '28) was the one fellow who could swing it up in the groove from which he started. All the fellows I have seen have tried to copy his style on that and have not got anywhere with it. In fact, when they did try to do it, they made the discus swing. The discus was ahead of them all the way around and actually assisted in turning them, while the discus should be back here just as far as you can get it without cramping your muscles. It should be back far enough so that your side has a feeling of being wound up, a feeling of complete tension. You can get that feeling of tension and you can take one little bend forward from the waist and all that tension is gone.

MR. POTTS: Don't you think a nervous type of individual gets his shoulders in before his hips have gone in and loses all the power from the lower part of his body?

MR. TEMPLETON: He might. He is apt to land with his hips completely turned forward.

MR. POTTS: Many boys are interested. They are not discus throwers but they would like to throw it. It seems that they fail to get the lower part of their body into it, and I figured that too many of them pulled this left arm (illustrating) as soon as their right foot hit. They pulled this arm through and the lower part of their body was already lost.

MR. TEMPLETON: Too many of them actually make their pivot and turn with their left shoulder and swing themselves around with that instead of letting the arms remain perfectly passive.

MR. NICHOLSON: How about the foot work?

MR. TEMPLETON: You find they keep moving up a little if you don't watch it. You have a hard time cutting down on that circle. You try to cut down on the first step, and that means you go off balance a little more and your hop will be longer. Eric Krenz worked it down to where the first little step wasn't over six inches. His feet were right together. When he did go off balance, he went off balance so far he just about jumped out of the circle in one leap.

I have asked a lot of good discus throwers how many turns they made, and they could not say. I have asked them where their feet landed and they tried to make out a diagram, but they had never thought of that before. They could not do it. They start that whirl and give a jump, and all they know is that they go into a tailspin.

I do not think there is any question but that the boys have done a poor job of learning control in the discus more than in any other event. Nobody knows how far they will throw it before they get through. Dunn is certainly not a master at form or control, and he threw 176-6 last year.

Southier, Ohio; Esley, Penn State;
Crutus Hamilton, California

Last Saturday he was afraid to try to throw hard because he could not keep a hard throw under control. He was just ladling them out and was getting 168 with no punch and no attempt to throw hard at all.

MR. NICHOLSON. Gentlemen, it is getting close to lunch time. Do you wish to continue now?

MR. TEMPLETON. When Carpenter gets hold of one, God knows where it is going to come down.

MR. CROWELL. He goes through the motions and just lets go of it.

MR. TEMPLETON. He has the best arm of any man I have ever seen.

QUESTION. Should you throw out to the right pretty well?

MR. TEMPLETON. That means your hips have gone through too fast.

QUESTION. You say go right straight ahead?

MR. TEMPLETON. Right straight ahead for your perfect throw, but often you get good throws over to the right because of the fact you get just a short, sharp snappy hip action right at the beginning and it will shoot that thing out there, but that is not the thrower's perfect effort by any means. Levy got one over 170 in the conference, which I think probably was the best attempt at just cutting loose with every bit of sock and power you have and really getting into it, but the discus did not sail very well. It wobbled pretty badly, or I think it would have gone considerably farther! However, it is not very often that you can do that. The other two were miserable efforts. He caught hold of the last one. There are very few discus throwers who can really try as hard as possible and get anywhere near a good throw.

MR. NICHOLSON. Are there any other important questions? Mr. Johnson has some announcements to make.

At this juncture several announcements were made and the program for the afternoon session outlined. A few matters concerning the business of the association were then disposed of, followed by a lengthy discussion of the proposal of President Johnson that an "Advisory Council" be formed within the association. As presented, the purpose of this body would be to assist in the government of the association and to decide on matters of policy throughout the year or at times when questions cannot be considered by the organization as a whole.

An advisory council was thereupon voted by the members, and the details of its membership left to a committee to be appointed by the president. The committee appointed, which was also to act as a nominating committee for officers for the following year, was named as follows. Robert Fetzer, North Carolina, Chairman. Clyde Littlefield, Texas; Harry Hughes, Colorado State; C. M. Jennings, Marquette; George Gauthier, Ohio Wesleyan; Charles Werner, Penn State; Brutus Hamilton, California.

Upon the proposal of the president, the offices of secretary and treasurer were voted to be one office for the coming year, and thereafter unless further change seems advisable. The meeting adjourned until two o'clock for the afternoon session.

THE QUARTER MILE HURDLES

MR. SCHULTE: I am going to ask questions rather than present a case for this event. Let's consider it briefly because, for most of us it gets our attention only about every fourth year. Now, as to the spacing of the quarter mile hurdles, it is a matter which you look up in the book and then wonder whether you have it right when you put it on the track. The running of it is a combination of hurdling and sprinting pretty close to a half. A man who can run a good half is going to have half mile power to run the quarter mile hurdles.

If I were going to train a quarter mile hurdler, I would start at the bottom. In other words, if he were running the low hurdles and I was going to switch him, I would not switch him to the hard hurdles to begin with. I would work him on the 400 meter spacings. In place of a hurdle I would use a little stick about two feet high, so he could have absolute assurance of running up to it and running through it if necessary. I would be careful not to intimidate him, make him afraid of hurdles.

I believe you will find your men will develop the stride to the first hurdle and the space in between much more readily by putting up some simple contrivance of that kind, which give them an assurance that if they do not get to it, they still would not hurt themselves in the least.

Beyond that, I will repeat, I have said everything I know. Your man has to have some style in hurdling. The better the style, the better he is as a quarter mile hurdler, plus the fact that he must be capable of running a good half mile or as a minimum, 400 yds. If he has these qualities--the ability to hurdle, the competitive spirit, and the stamina to carry through--he ought to make a good quarter mile hurdler.

MR. ROOME: I might state that the normal number of strides to the first hurdle is either twenty-one or twenty-three, depending upon the man. Hardin's (Glenn Hardin of Ia. State) is twenty-one. The number of strides between the hurdles is fifteen. The perfect race is fifteen all the way through. You find most boys able to take the first six hurdles in fifteen strides and then they will have to drop off to seventeen for the remainder. Hardin had to do that in all of his races up to the final race in the Olympics in 1932. In his final race there he ran them all the way through in fifteen. However, since that time he has been able to carry through fifteen all the way.

MR. MOORE: The form, I think, is just exactly half way between low hurdle form and high hurdle form, with arm

The meeting convened at two-thirty o'clock, Mr. Franklin P. Johnson, President of the Association, presiding.

PRESIDENT JOHNSON: Our discussion of the quarter mile hurdles will be led by Henry Schulte.

THE QUARTER MILE HURDLES

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Beyond that, I will repeat, I have said everything I know. Your man has to have some style in hurdling. The better the style, the better he is as a quarter mile hurdler, plus the fact that he must be capable of running a good half mile or as a minimum, 660 yds. If he has those qualities--the ability to hurdle, the competitive spirit, and the stamina to carry through--he ought to run a good quarter mile hurdle.

MR. MOORE: I might state that the normal number of strides to the first hurdle is either twenty-one or twenty-three, depending upon the man. Hardin's (Glenn Hardin of La. State) is twenty-one. The number of strides between the hurdles is fifteen. The perfect race is fifteen all the way through. You find most boys able to take the first six hurdles in fifteen strides and then they will have to drop off to seventeen for the remainder. Hardin had to do that in all of his races up to the final race in the Olympics in 1932. In his final race there he ran them all the way through in fifteen. However, since that time he has been able to carry through fifteen all the way.

MR. MOORE: The form, I think, is just exactly half way between low hurdle form and high hurdle form, with arm action about the same. You get just about half of the body bend in the 400 meter hurdle that you get in the high hurdle and a little bit more than you get in the low. That is my idea. I do not know whether or not that is correct, but that is my idea. That is about what Hardin does. He works on his form by putting three 400 meter hurdles on the low hurdle spacing. If you would put three down there at 400 meter distances, that would be quite a bit of ground to cover in the afternoon.

MR. SCHULTE: Hardin must have his spacing naturally. Most boys would have to work on the spacing of the 400 meter hurdles in order to get to the hurdle. That would not fit everybody.

MR. MOORE: No, it would not fit everybody. That is about all I know about it.

MR. FETZER: Is it desirable if this man can alternate?

MR. MOORE: I would think that if a man could alternate, it would probably help him out, because I have seen Hardin in trouble over the hurdles, and I have seen other fellows in trouble over the 400 meter hurdles, where if they had alternated it might have helped them.

MR. SCHULTE: If that alternation should happen to come on a curve, it would be serious for them.

MR. FETZER: Mr. Moore said that Hardin ran the first part of his race in fifteen, and then formerly he was dropping to seventeen strides, I wondered if he might run as far as he could go.

MR. SCHULTE: Would he go faster at sixteen or at seventeen? Change in style and body angle and control would be important there.

MR. FETZER: The other point is that he might get up on the hurdle and need to get over it some way. I wondered if it would be any advantage to practice alternating, or, if he were naturally adept at it, to try to improve it.

MR. MOORE: Have you ever seen anybody alternate his feet on the 400 meter hurdles when he got in trouble?

MR. ROBERTSON: No. They have taken seventeen strides. They did not alternate.

MR. JOHNSON: Lord Burleigh (England) practiced alternating. He wanted rhythm in taking the hurdles. If he was going to be able to get over them when he was in a jam, he had to alternate.

MR. SCHULTE: Has anybody else a question? We do not want to take a lot of time on this event.

MR. HILL: It is a very fine event.

MR. MOORE: What is your experience in the variation of time on the quarter and 400 meter hurdle?

MR. SCHULTE: Who has any facts to answer that question? In other words, how close to his actual flat time can a man run hurdles?

MR. MOORE: My experience has been about four seconds. I wonder if that is similar to your ideas.

MR. HILL: I think it depends upon the man. I have a boy who can not run a quarter in better than 51, and he ran 53.6 in the hurdles. I think the longer we run these quarter mile hurdles, the closer we are going to get to the quarter mile time. We run a lot of quarters.

MR. SCHULTE: What is next? We are through with this event.

FACTORS PERTAINING TO CONDITIONING

MR. PRESIDENT JOHNSON: Gentlemen, we may as well go ahead with another part of our program. One of the problems of track coaching is conditioning, that is, the proper conditioning of men. We feel that we have here today an authority on this particular subject, Dr. Simon Benson, of the Michael Reese Hospital in Chicago, a former trainer here at the University of Chicago, who has consented to give us some of his valuable time away from the hospital to tell us what he thinks of some of the factors affecting the conditioning of track athletes. I know he speaks with authority. I shall turn this over to Dr. Benson.

DR. BENSON: Mr. Chairman, I just happened to see my old boss, Mr. Stagg. I want to shake his hand.

I was called this morning at eight-thirty by my friend, Mr. Olsen, to talk on conditioning. I have been in bed four days with the flu, so I should be talking about unconditioning. However, the opportunity to "talk back" to some coaches was too tempting, so I decided I would do my utmost to come here for that chance alone. Since Mr. Stagg is here, however, I am not going to be so very arrogant! You know, I worked under Mr. Stagg for nine years, an experience I shall never forget, and of all the coaches I have ever had to deal with, he did the least talking of any of them, at least as far as my work was concerned. I do not know whether he considered me hopeless or whether he had confidence in me. Whatever it was, he certainly didn't bother me.

What I am going to talk about refers almost entirely to the results of some work I did at the University of Chicago under Mr. Stagg, and later under Mr. Metcalf. The work was supervised by Professor Carlson, of the Department of Physiology. However, I will accept the blame for anything that might be wrong with it. I hope you attack it, and I will see if I can defend it. Some day I may publish it and, therefore, I want all the criticisms possible, especially from a group of men like yourselves who are in the field.

I thought of two problems, one which affects you directly out on the field where you may observe and measure the conditioning of your men. The other problem concerns you and the trainer. How much of this problem you take

*Weight
Charts*

on to yourself and how much on the trainer, depends, of course, on your confidence in the trainer, how well qualified he is, and the cooperation developed.

The first problem, then, is a weight-problem. Three or four years ago I became interested in whether or not a closer and more analytical study of the athletes' weight charts would reveal something more important than the data hitherto gathered therefrom. After much fooling around, and wasting of time, as one usually has to do on a new problem, I devised the following scheme, a part of which was described in the Athletic Journal last January, and where some of you may have seen it.

We shall say that a man weighs 180 pounds. A line is drawn representing the base line for his weight for the whole season--representing 180 pounds. When his daily weight rises above this base line, it indicates a corresponding gain above the initial weight and if his daily weight line drops it indicates a loss.

Illustrating: We shall say that this man (E) weighs 180 lbs. The line (X - Y) is the base line for his weight for the whole season--representing 180 lbs. When his daily weight graph rises above this base line, it indicates a corresponding gain above the initial weight of 180 lbs. and vice versa.

I might add that this system which I am about to describe applies particularly to football, because the games come with great regularity--every Saturday. In basketball, it is not so strikingly illuminating because the games come oftener and with no definite regularity. In track, I do not know just how the system would work, but I see no reason why it would not be as effective there as in any other sport.

We find then that the man started out for the first practice weighing 180 lbs. During the practice he loses 2 lbs, which we may indicate by a line extending downward from the base line. This was a morning practice session. A second line will show what happens during the afternoon session.

The morning weight-loss of 2 lbs. was not only recovered, but an additional pound was added during the noon rest period, and the player's pre-practice weight in the afternoon was 181 lbs. There was then a loss of 3 lbs. during the afternoon practice, and the player quits that practice at the same weight he quit in the morning, namely 178 lbs.

The next morning, Saturday, he again starts out for practice weighing 180 lbs., loses 3 lbs. and returns for the afternoon practice weighing 179 lbs. During Saturday afternoon's practice he loses 2 lbs., and thus leaves for a day's rest weighing 177 lbs.

This other man had a limit of three pounds, and if he lost four, he would not regain. This other man seemed to be able to regain almost any loss.

The short interruptions in the graphs represent Sundays, on which no practice is held, and the lines indicate 2 practice sessions a day except Saturday when he missed the afternoon session. The following week he missed two practice sessions, Thursday morning and Saturday afternoon. After the third Monday, there was practice only once a day and the lines indicating the weight losses are therefore twice as far apart.

With the above explanation, we might now take a more distant view of what the chart as a whole reveals. In doing so, however, one must always keep the individual player in mind. For example, while one may not logically expect a player like A, to experience such a sudden gain in weight as shown in his individual graph, one could quite reasonably expect the seasonal loss in player C, as shown by his graph. But, there is nothing to indicate that seasonal gain by A is not as normal as the loss by C.

Now, then, from the graphs it may be seen that, in general, the players fail to regain large losses in weight. This is, of course, what one might expect, but it should be noted that there appears to be a definite maximum loss from which a player may recover by the next practice session--and that this maximum loss varies considerably in different individuals, and is seemingly not proportional to his body weight.

For example, in one case which I took to analyze one of our players, I found this. He had a loss here of three pounds. If he lost three pounds or less he would regain it. If he lost three and one-half pounds to four pounds, he would not regain it. In other words, there was a definite limit to what the man could lose and regain. If he lost more than that, then he did not regain it. So this upper line, representing his pre-practice weights, did not tell me all I wanted to know. This upper line as stated represented only the pre-practice weights, which are the weights before he went out to practice. If you keep that line alone, you know only that he has not regained his loss, but you have no way of knowing how great his loss was--that is, how much he had to regain to return to his previous weight. One would not know the maximum weight which he could lose and regain. I called this weight his critical weight or the critical loss. I had one boy who could lose six pounds and regain it, and he wasn't a big man either. I thought this critical weight would vary according to the weight of the individual, but it doesn't seem to. I had one man who could have a very great loss in proportion to his weight, but he would always regain it, and sometimes more. He had a "critical" limit of six pounds. This other man had a limit of three pounds, and if he lost four, he would not regain. This other man seemed to be able to regain almost any loss.

the largest therefore be attributed to other causes than physical over-exertion.

The first two weeks of the season, when nothing else affects the man but exercise, you can, by such a system as this, if you watch it, determine each individual man's critical loss. Then, I say, that ANY PRACTICE DURING THE SEASON WHICH MAKES THAT MAN LOSE MORE THAN HIS "CRITICAL" LOSS IS OVERTRAINING. Such a man receives too much work if he can't regain his losses. There may be individual exceptions.

From a physiological point of view, it appears that the critical loss which I am talking about consists mostly of fluids--water, etc. and when you over-step that limit, you have marked tissue destruction, and that cannot be replaced by the next day. That is my present interpretation of those weight losses.

There was another interesting observation, namely the WEEKLY weight variation, as it regards football players particularly. I said it didn't show so well in basketball because there was no such regularity in playing the games. In track it will probably do the same.

If we divide the season up into weeks and we have games every Saturday you find a peculiar thing, something that you don't expect--at least, I didn't.

You find that as the playing season starts, after a heavy loss on a Saturday, the players will gain weight up until about Thursday, in spite of the fact that this is the part of the week that you work them the hardest. This may be true in track, I don't know. I didn't check up on the track men. However, it would be worth doing. Up until Thursday then, they gain weight. From Thursday to Friday they lose, and from Friday to Saturday they lose some more. The important feature is that they regain their losses up to this point. From Thursday to Friday they don't regain all of what they lost on Thursday's practice, and the same from Friday to Saturday. Sometimes they not only fail to regain, but there is actually an additional loss, and this in spite of the fact that they don't have any practice.

Hence, the weight graph takes a quite regular week-end dip, and it is to be noted that this dip comes before the game, not after. There seems to be no power to regain the losses from the Thursday and Friday practices. It is evidently a psychic factor. (I have often been curious to know what happens to track men under the same conditions). The men will gain the first part of the week in spite of your hard training. From Thursday to Friday they do not regain, and this holds true also from Friday to Saturday. This gives you that weekly cycle or dip.

Now then, if the daily losses on Thursday and Friday were greater than the individual's previously determined "critical" weight loss, then such a dip could be expected. But there is no evidence of such a great daily loss, and the dip must therefore be attributed to other causes than physical over-exertion.

If, for example, the critical loss is 2 lbs., and they don't regain a 2 lb. loss, then there is something else wrong. Either they are worrying, or they are not getting enough food or they are having too much night life, or something. It may be as stated, either a digestive disturbance, or lack of food, or loss of sleep, or worry over the game. There is some cause there, and that may vary with different individuals. That enters psychology, and that you have to determine with the individual. You will soon note that the weekly dip is most pronounced in so-called "high-strung" individuals.

We had a striking example of it a few years ago. A little friction broke out on the football team between some of the players. One player in particular became involved. There was even a fist fight. At any rate, this boy had previously come along fine for about two weeks as far as his weight was concerned, and was regaining all daily losses. All of a sudden he took a dip down. He lost, I think eight pounds. Here is where the right took place (illustrating). There was a continued mental disturbance here for some time between this player and a small group of the players, and it took four weeks before he got back to normal. He was moody, worried, and I suppose you would call it. The dip in the graph does not of course, show the cause of the mental disturbance, but shows its existence. I didn't plot the curve until after the season was over, but it fit in exactly with the period when this disturbance took place.

That is the point I wish to make in regard to the weight problem. You may watch it for yourself out on the track. If you have any questions I shall be glad to discuss them.

QUESTION: How do you establish the base line? Say, with football candidates, how do you say 200 is the right weight?

DR. BENSON: Weigh them the first day they go out for practice. If a man weighed 178, I put 178 down for the line. Another man may weigh 180 and in that case the line represents that weight throughout the season.

QUESTION: There may be a difference in the preceding training. One may have been working hard all summer. He may have a low base line in the beginning.

DR. BENSON: If so, you will notice it. If he reports in good condition he should remain pretty close to the established base line; otherwise he will probably go below, although in some cases there is a tendency to gain weight in training.

QUESTION: Does it take two weeks to establish the base line?

DR. BENSON: No. The base line is set at his first weight, what he weighs when he comes in. One of our players

weighed 156. He shot up to 160, but then he went down to 159 and stayed there. But for the season his base line remained, however, at his first weight, 156, but his best playing weight was 159--three pounds above the set base line. But, in two weeks' time you should be able to find out what his best playing weight is, and then you should try to keep him there.

QUESTION: You have a permanent base line and a pre-season base line?

DR. BENSON: The two lines begin to climb. This shows he was in fair condition when he started. He belongs above the base line instead of below. The base line represents his initial weight.

MR. JOHNSON: In other words, the relation between the base line and his playing weight line should stay about the same.

DR. BENSON: After it is established, yes. But, as I have said, there are exceptions. This man who weighed 220 pounds and lost sixteen pounds during the season is one. You must know your man.

QUESTION: Were all these men approximately the same age?

DR. BENSON: They would be on a team like this--anywhere between eighteen and twenty-three or twenty-four. Within that age limit there should not be much variation. The individual differences count more than the difference in ages.

MR. NICHOLSON: Where does the weight that is lost from Thursday until Saturday go? Is it malnutrition, or what is it that makes them lose it? They always do.

DR. BENSON: Well here is evidently what happens from Thursday to Friday. Suppose he weighs 175 lbs on Thursday before practice. Then he loses, say, 3 lbs. He should then gain 3 lbs. by Friday, if he regains normally. But, say, he regains only one pound--or none at all. In other words, he doesn't lose, but he fails to regain. On Friday he goes out again and loses, perhaps another 2 lbs. As a rule on Friday they don't have hard practice. This brings his weight down to 171 lbs. But he will as a rule not regain even that 2 lb. loss. He will stay at 171 lbs. until game time on Saturday, or he may even experience a further loss from Friday to Saturday. It is perhaps merely a question of lack of digestion.

MR. NICHOLSON: If you weigh them just before the game you will find they are much lighter than ever.

DR. BENSON: Yes, in many cases that is true, except of course that they always lose further during the game. The loss however seems to begin on Thursdays.

MR. NICHOLSON: Where do they lose that, physiologically?

DR. BENSON: It's not a loss as such, it's rather a failure to regain what they lose in practice. We call it

a loss. The actual loss is caused from practice. It appears to be a failure to digest food. That is my interpretation. It might be due to worry or nervous indigestion. Of course, in extreme cases, there are direct losses from Friday to Saturday.

MR. TEMPLETON: What do you do if he is in an uproar all season and never has a chance to regain?

DR. BENSON: I used to live on boiled milk and crackers for about three days before I had any wrestling matches, and then it didn't always work. I don't know about that. That is a hard problem to cope with. It comes under diet and psychology. But the extent of the "dip" in the graph should give you an indication as to how severe the problem is, and that should be of some help.

There is another problem which comes closer to the training room. I might do a little missionary work and perhaps create a little better understanding or, perhaps, cooperation. It is always difficult to see the other man's problem, especially as between the trainer and the coach. It is extremely difficult for both of them to see the same problem.

I wish I could picture for you what we call the traumatic injury, which quite well covers all athletic injuries. It is a tear of the tissues. I am giving my own opinion, and I will defend it as far as I can. You cannot work out a sprain. It is not logical to work out a sprained ankle. You have torn tissues and what you need, of course, is rest. In the first place, put the torn tissues back in their proper position by taping, and follow this with absolute rest from 24 to 48 hours. Then, after that you are better able to determine how bad the injury is. Then proceed with your treatment.

I shall choose one injury which affects all of you, and I shall discuss that briefly to show how I finally developed my method of treatment. You may not agree with me. I shall give you my reasons for it. Let us take a sprain.

This will be a leg (illustrating). If a man sprains an ankle he will have pain. That is evident. You will have greater pain on motion, with resultant limitation of motion, you also will have that bugaboo, swelling, to consider. The seriousness of the sprain does not always correspond with the swelling.

When you sprain an ankle, you do one of two or three things, and if you do all three you have a real sprain, to be sure. One thing is certain, in all three cases you have torn some tissue. First then, you may have torn just vascular tissue, and if so, you'll get a swelling. If you have torn a lot of blood vessels, it will turn blue, and look quite ugly. Yet it does not mean that you will be laid up very long. If, however, you have torn a ligament, always comparatively deep seated, and which

vaso-constriction. We then apply a permanent pressure you find difficult to tell to begin with (there is no definite way of telling, so far as I know) you may have little or no swelling. A torn ligament has little to do with the swelling, but the torn ligament is the thing that will decide your recovery period. If only vascular tissue is torn the injury heals very rapidly with proper care, and in three or four days, and perhaps less, you will be able to play. If however, you have torn a ligament, you will not do much playing inside of two weeks. Whether or not ligaments are involved and are really torn, can best be told by the rate of recovery during the early period. When ligaments are involved to any extent the rate of recovery is very slow. Suppose a player comes in off the field complaining of an injured ankle. Generally, if the shoe fits well it will prevent the swelling until it is removed. As soon as the shoe is removed, however, the swelling may appear rapidly, depending on how extensively the vascular tissue is involved. Quite frequently you can see it swell as if it were being inflated with an air pump. Now, what is to be done? Hot water, cold water, or what? That is an interesting problem. I don't know what your trainer does, or what you do. The first thing we want to do is stop the hemorrhage in the torn tissues. The vascular tissues which feed this fluid into the wound are naturally torn. The fluid flows into the wound but cannot flow out again as the openings of the "out-going" vessels collapse. What we want to do is stop the swelling **and, this can best be done by plugging up the tubes that lead into the torn tissues.**

The quickest way to do that is to put on a pressure pad. You compress the vessels mechanically. You must not do it so hard as you will stop all circulation. Next you must have coagulation of the blood in the vessels to form "stoppers," so to speak. That is the next problem. You may then apply heat, but heat dilates the vessels coming in and makes them larger thus causing increased bleeding. That is the difficulty there. But heat hastens coagulation, and thus puts "stoppers" in the vessels, and thus stops the swelling from that point of view, but as stated it dilates the vessels at the same time, and thus hastens the swelling before coagulation takes place. If you put on cold, you constrict the vessels and slow up the inflow of the fluid, but now you retard coagulation. Cold inhibits coagulation of the blood. Therefore, while you constrict the vessels, you prolong the inflow of the fluid. You are thus between the devil and the deep blue sea.

After much deliberation and experimentation we decided to take a medium course. We put on a pressure pad just temporarily and then shoot the ankle into fairly cold water for about two or three minutes--just enough to produce

vaso-constriction. We then apply a permanent pressure pad and taping, wrap the foot and ankle in cotton, to maintain warmth. We have thus produced first, vaso-constriction by the cold, then put on taping to hold the constriction and prevent swelling, and then we have applied cotton to warm the part slowly to produce coagulation. After that it is just a question of treatment, of course. The above is, so far as I can see, from a physiological basis, the sane treatment of any injury of that type. It can be applied to all your traumatic injuries.

I don't think I will take any more of your time. We could talk of a number of things, I presume.

MR. NICHOLSON: How are you going to find out if there is a ligament injury?

DR. BENSON: As far as I know-and as I have already stated-you can find that only through the rate of recovery during the first three or four days of treatment. After the above indicated treatment, you send him home. You put the patient to bed and elevate his leg. Put a heating pad under the foot merely to keep it warm-not too hot-for twenty-four hours. Then, the next day when he comes back, the swelling should be fairly well gone. Having the patient step on the foot, very carefully, will give a pretty fair indication of how much pressure may be tolerated on it. The best way to measure that pressure is to have him step on a spring scale. Otherwise you have no method of telling how much weight he puts on it. If he steps on a spring scale, putting as much weight, up to a point of pain, as he can on the foot for the first three or four days, you can note the progress quite accurately, and from this rate of progress you can tell quite well whether or not the ligaments are involved. If the ligaments are involved, the rate of progress will be very slow. There will be hardly any increase in pressure tolerated on the foot at first. About the sixth or seventh day he will begin to put on increased pressure, and then there is no other conclusion to draw except that the ligament was involved.

We know from experience that vascular tissues will heal fast while ligaments will not. Therefore, there is no other conclusion to be drawn except that the ligament is involved if the healing is slow. By the fourth or fifth day you will be able to tell the difference by that method. Then you can figure he is out for about two weeks. In football, with proper taping, he will be back practicing in ten or eleven days. I have graphs showing the results of five or six hundred injuries that you may look at when I get through.

MR. JOHNSON: Doesn't it often happen that you strain a ligament without the accompanying swelling?

DR. BENSON: Yes. I am glad you brought that up. You can't unless you understand the mechanics of the body. That is really important. It all depends upon where your sprain is, how you want to support it, what the man is doing, and so forth.

can have a badly sprained ankle without much swelling. A fellow can come in and have hardly any swelling at all. How they do it, I don't know. I presume their vascular tissue is so elastic that they are able to turn the ankle so far that the ligament tears before the vascular tissue does. I had one case in particular some years ago, I think the man was out for four or five weeks and the ankle was hardly swollen at all when he first came in. But later there was nothing else to conclude but that he had merely a pure ligamental strain, and that there was no vascular tissue involved to speak of. There was no swelling and just a little discoloration. That was all there was to it, but he simply could not use that ankle. There were no breaks. You may then have a badly sprained ankle with no swelling at all. That is why it is important to prescribe absolute rest for twenty-four hours, and then you are pretty well able to tell what you are handling.

MR. JOHNSON: That is what we had, and we didn't know for several days that it was a sprained ankle.

DR. BENSON: I had two or three, but I remember this particular one because when he came in I said, "He will be back in two or three days." He wasn't back in three weeks, so I was fooled pretty badly. That is why I said you shouldn't let a swelling scare you, but on the other hand, don't be too optimistic--too sure of yourself--if there is no swelling present. Even if it is there, you don't know what you are handling. The swelling is therefore necessarily related to the severity of the sprain.

MR. JOHNSON: Isn't it generally conceded that after the first acute soreness of a sprained ankle is over, the best thing you can do for it is to give him good exercise on it--plenty of walking?

DR. BENSON: If you can supervise the walking. By that I mean keep walking below the point of pain. It is one of the finest things to do if you keep it within the proper limit, but if you begin to overstep it, then you continue the irritation. After three or four days he should begin to walk to the extent to which he is able, but he should be watched very carefully. And when he goes out on to the field, the coach's judgment is very important, to see that he does not overwork himself. It is only by such procedure that he later regains his full strength.

QUESTION: The injury that affects the track coaches most is the torn muscle. Are you going to discuss that today? How to prevent it is of even more importance.

DR. BENSON: That is like asking how to prevent automobile accidents. Go slow, don't speed. One thing which the coach or trainer should know and must know in order to handle those things is physiology, and body mechanics. You cannot apply supports or taping properly for these injuries unless you understand the mechanics of the body. That is really important. It all depends upon where your sprain is, how you want to support it, what the man is doing, and so forth.

MR. NICHOLSON: I think he is talking about the hamstring muscles in the thigh.

DR. BENSON: How they pull them? You know that as well as I do.

MR. ROBERTSON: How do they pull them? What causes it?

DR. BENSON: It is just an overstrain. It is an over-exertion of the muscles and the tissues just give-tear-rip-or whatever you prefer to call it. They may rip in the muscle, where the muscle comes into a tendon, or they may give where the tendon originates from the bone. That is in the upper region, as a rule, or, the muscle may tear any place. But the terms "strains" and "sprains" are always used very loosely. They both mean torn tissue, except a contusion, which we think of as tissues crushed by a blow.

MR. ROBERTSON: The sheath of the muscle pulls away a little bit.

DR. BENSON: It depends upon how extensive it is. A part of the muscle may even stick out. It is all a question of degree, but it is always a tear.

MR. TEMPLETON: That doesn't hurt the muscle. The sheath doesn't affect him.

DR. BENSON: You say it isn't painful?

MR. TEMPLETON: He can certainly run on it without hurting himself. He doesn't use the sheath. It has no active part in his exercise. It is protection.

DR. BENSON: Then why does it tear?

MR. TEMPLETON: I imagine because the muscle itself goes through it. The sheath is merely protection for the muscle.

DR. BENSON: Yes, but if there were no strain on it, it would not break.

QUESTION: Will you discuss the injury that usually comes in the belly of the muscle?

DR. BENSON: It is a trauma, it is torn tissue. We call them traumatic injuries. Here is a belly muscle (illustrating). Suppose the fibers tear or the sheath tears, or that they both tear. You have an internal hemorrhage. That is all you are handling. That is exactly what you are handling in the case of a sprained ankle. You have torn tissue with an internal hemorrhage. The problem is physiologically the same. You have a torn tissue which is painful on motion. Because of the torn vascular tissue, the fluid flows in.

Suppose we have a rubber bag here with a series of fine tubes going through here, with fluid in them. This is my mental picture of what happens in these traumatic injuries. Suppose as this fluid flows through here I put some strain on this thing so that I snap off some of these fine tubes. I tear those vessels. What happens? Fluid flows

in, and collects there. That is what I do if I tear a muscle. I rip some tissue there. How many lymphatic tissue or capillaries are torn, I don't know, but one thing is certain you do tear tissue. If I rip these off, these fine tubes collapse. There is nothing to hold them open any more, but there is nothing to stop the fluid from flowing in. But where does it go? It begins to spread in the surrounding tissue and you have a swelling.

In any traumatic injury, that is what you have. If there are a lot of big lymphatic vessels in there or small capillaries, the bigger the swelling, and the first thing you want to do and as quickly as you can, is to stop the hemorrhage. What you want to do is put a "cork" in the "incoming" tubes to stop the fluid from coming in.

MR. NICHOLSON: It is pretty hard to get to those hamstring muscles because they are down so deep.

DR. BENSON: You don't have to get directly to them. Fluid is non-elastic and non-compressible. If fluid is going to flow out into the surrounding area, it can't flow here unless something else gives away to make room. If it does, then this wall must move out a little bit. If you are going to put excess fluid in here, this tissue must expand. If it is unstretchable or non-elastic, no fluid can flow in. Therefore, if I can put a support against this "wall" and also against this "wall", that will prevent them from going out.

MR. ROBERTSON: In this particular injury there is seldom swelling. Once in a while there is a hemorrhage, but there is seldom any swelling.

DR. BENSON: There is seldom any local swelling, but the thigh as a whole swells.

QUESTION: Suppose you had another muscle coming down here, joining this sheath, and some slips tore up here. You would have a place here where you could stick three or four fingers in. That is what Mr. Robertson has in mind. I don't think the blood has anything to do with it.

MR. ROBERTSON: That isn't what I have in mind. You all know what a pulled tendon is. The sheath of the muscle pulls away and there is no swelling.

MR. JOHNSON: You mean you can't see it. There must be a general swelling.

MR. ROBERTSON: If you take the girth of the leg, you won't find it any larger than the other leg.

MR. STAGG: There are two theories. One is that the sheath surrounding the muscle breaks, that is, stretches. You mentioned that the sheath is involved or may be involved. You also mentioned that the muscle itself has a tear and it is used in that condition. Has research been made on an individual or frogs or anything else in which such things have happened so that you can tell whether it is the muscle sheath or the muscle itself that is involved? If you have pain, the muscle is involved, isn't it?

possibly an inch or two below it, and is merely a couple

DR. BENSON: I don't see how you can evade it. Even if the sheath is torn, it is torn by the force of the muscle. There is nothing wrong with these two theories. I said awhile ago in the case of a sprained ankle, you may have a large swelling which would merely indicate the tearing of vascular tissue. What I discussed here was the tearing of tissue. If you tear a ligament, you may have only a small swelling. How vascular the sheath is, I don't know, but evidently it is not as vascular as muscular tissue, so when you tear a sheath you will have a comparatively small swelling. You may tear the sheath and have little swelling, but remember that even considerable swelling in the thigh, up here, is hard to measure. It has to be quite a hemorrhage up in the thigh to be seen, and if the sheath alone is torn, I don't think you could measure the swelling.

MR. NICHOLSON: It is very difficult to know what to do about those things. Mike Murphy said, "If a tendon is strained anyway so that the boy can feel it, there are many methods of treatment, but the best treatment is rest. No matter how small the strain, you should not put that boy in competition before one month's rest." I have found that every time I have taken a chance on the leg in less than that time, I have ruined them.

DR. BENSON: I think that is right. The reason is, of course, that the sheaths and tendons have such a poor blood supply that they heal very slowly. A torn tendon heals as slowly as a bone. That is, of course, the reason.

MR. TEMPLETON: That might be perfectly true if you could determine the nature of the injury, but you can't without cutting it open.

DR. BENSON: But you can get a fair indication within a few days by watching his rate of recovery.

MR. NICHOLSON: What has been your experience with those? Did you run them in less than a month?

MR. TEMPLETON: Some of them get well, and then you know they didn't tear a muscle, that they just got a cramp. Some of them don't get well, and then you know you should not have used them.

MR. NICHOLSON: You run them and I don't. That is just the difference.

MR. ROBERTSON: What do you put on their legs?

MR. TEMPLETON: I have never found any kind of bandage that I thought affected anything but their mental status.

MR. JOHNSON: George Bresnahan has a kind of preventive bandage above and below the muscle.

MR. BRESNAHAN: That is just a prophylactic strap, after a man has had the pull and has had a week or two of rest. It is simply a device to prevent, if possible, a recurrence of a muscle tear or a sheath tear. If you happen to know where the injury is, the bandage is placed

possibly an inch or two below it, and is merely a couple of turns of one inch tape around the leg.

MR. ROBERTSON: Is that meant to strengthen the muscle?

MR. BRESNAHAN: Yes. We have used it on three or four boys who have had that pull.

MR. HILL: Apply it to the leg with the muscles flexed?

MR. BRESNAHAN: No, with the leg in a natural position.

The amount of tension in a circular manner is determined by the athlete himself. It is as tight as he can stand it and still compete.

MR. STAGG: All the way around?

MR. BRESNAHAN: Yes.

DR. BENSON: Did you say you use elastic bandage?

MR. BRESNAHAN: No, adhesive tape.

DR. BENSON: Adhesive tape is better because it does not suck.

MR. NICHOLSON: I found that no matter how small the strain has been, I feel they need a month's rest. If you do rest them a month, you have a big chance of the thing never coming back. Take the case of this boy from Temple. (Peacock). He pulled one last summer and later he pulled another one. Once you really pull it, it is very, very easy to come back.

QUESTION: I have seen a boy with a break so big you could almost put your fist in there. When he got well there was a dent there big enough to put a goose egg in.

MR. NICHOLSON: Didn't that have a tendency to recur?

QUESTION: Yes, but he could run and use it.

MR. TEMPLETON: That tendency to recur might have been felt because of the scar tissue which was left in there and which was jagged, but that doesn't mean the muscle didn't heal perfectly. There is no reason why a muscle won't heal perfectly.

MR. NICHOLSON: Did Peacock pull the same leg in the same place?

MR. ROBERTSON: He pulled the other leg. He has a stone bruise on his heel and he has two pulled tendons, all three of which are getting better.

MR. JOHNSON: Since this seems to be something of a controversial issue, maybe it would be interesting to have an expression as to how many have found pulled muscles recurring after a reasonable length of time for resting the injured place. How many find that it often does recur after you have thought you have given it plenty of time to heal?

MR. NICHOLSON: I have found in fifty per cent of the cases it occurs on the other leg. That isn't as foolish as it sounds. I mean the boy is afraid of this leg and puts more strain upon the other one and pulls that.

MR. JOHNSON: How many think they have reason to believe that recurrence of a pulled muscle, assuming it is in the same place, does not happen very often?

MR. TEMPLETON: I grew up with the idea that once a muscle was pulled, it was never any good any more. I don't believe that works out. I do believe the scar tissue which is left from a real pull is an annoyance for a good many years afterward. It might be an annoyance which causes the runner to keep that leg pretty tight, and he might pull in that same neighborhood too, but with these muscles that are so very small, you can't tell which little muscle it is.

MR. NICHOLSON: It means the whole muscle has been shortened, so it is more easily pulled the next time.

MR. TEMPLETON: It heals absolutely perfectly, but you have no method of getting rid of that scar tissue except by circulation, which takes years before it wears it away.

MR. HILL: That would make the muscle less elastic. The scar tissue itself would help shorten you up a little.

MR. SCHULTE: Don't you think we are missing one thing in the whole discussion: that a boy begins to fear he is going to pull it because of a sudden strain. It is more psychological than physiological.

MR. HILL: I think one of the best recoveries I have ever known of was that of George Simpson (Ohio State '31).

QUESTION: George Simpson pulled his muscle before he entered college, and he pulled it three times afterward.

MR. JOHNSON: Gentlemen, this discussion is assuming the nature of just the sort of thing we had intended in originating the subject with Dr. Benson's talk. We had intended to follow this discussion of training with a general forum on conditioning in which we could speak of diet, sleep, smoking, activities the day before a meet, methods of travel, bathing, (warm compared with cool), exercise and rest on the day of the meet, the proper method of warming up, (how long and how far), working out alone, use of the stop watch, mid-week time trials, and all these things. Dr. Benson, would you care to sit with a panel of gentlemen here to whom questions might be directed on this conditioning question?

QUESTION: Before we get away from the matter we have been discussing, what we are really interested in is ways of preventing it. I should like to know how to prevent pulled muscles. I am glad to give my own experience, and I should like to listen to others in that regard. My remedy was simply warming up and stretching on the table. as you take a hurdler through his stretching exercises.

MR. HILL: He had better be warmed up before he starts to stretch.

QUESTION: I mean passive exercising is distinctly helpful, I think, particularly in the hamstring muscles.

MR. TEMPLETON: That, of course, is the universal idea and it is the track coaches guarantee. It is his insurance, because whenever a man pulls a muscle, if anybody wants to criticize, the coach can always say, "We surely had

him warm up plenty. He high kicked and everything else, but nevertheless, he pulled a muscle." Did you ever run off an intramural meet where they pulled a muscle? They don't stretch and they don't high kick. I have never had a pulled muscle in an intramural meet where they wouldn't warm up.

QUESTION: They aren't able to put enough pressure on themselves to pull a muscle.

MR. HAMILTON: A man running 9.6 is using his muscles to the maximum of their efficiency.

MR. TEMPLETON: But those muscles have been well trained. They are much better off than they were in the fall when he could run only ten flat. He is working just as hard at ten flat.

MR. JOHNSON: But the untrained man doesn't have his muscles in condition for maximum efficiency and he is less liable to have this injury.

Are there any other observations?

MR. ROBERTSON: I used to sprint and I pulled these thigh muscles twice. In each case I found it came from overtraining. Ninety per cent of the pulled muscles come from too much sprinting today. That is just an opinion. As far back as 1908 I saw Mike Murphy bandage up a man's leg that was pulled. He strapped it up overlapping the strapping. It ran around about two-thirds of the leg. I did find in my own case that by using a plain rubber bandage wrapped around the leg from the knee upward all the way up to the crotch I could run with it after three weeks. I used it on other sprinters and football players very effectively. This was a pure rubber bandage about two inches wide. That gives the belly of the muscle support and keeps it intact and holds it so that when you stretch it, it doesn't have the tendency to recur.

MR. JOHNSON: A two-inch bandage wrapped in a spiral?

MR. ROBERTSON: From the bottom up. Of course, it is attached with adhesive tape around the bottom and top so it does not slip down.

DR. BENSON: It amuses me when you talk about these bandages. Whether you use an elastic bandage or whether you use tape, or whatever you use, it all depends upon how you apply it. Sometimes the shifting of a piece of tape a half inch will make it either a fine bandage or a poor bandage. I have sometimes merely shifted a strap on an individual and then it would be a fine taping. Do you realize what you are doing when you put on an elastic bandage? Here (making a drawing) is a cross section of a leg and you have a hemorrhage in there.

MR. ROBERTSON: This is after three weeks.

DR. BENSON: Conditions will change with time, I will admit, but it is equally true that this area--where the hemorrhage was--is still the weak area which we are trying to support.

If you put an elastic bandage around there, it will "give and take" with the muscle. It will permit the muscle to expand more because it is elastic. But after the muscle has come to rest, the elastic bandage comes along and it sucks and hinders the circulation of the return flow to a certain extent, but it will give the muscle a bigger play, and I think it is quite right that after a certain period the elastic bandage is better.

Tape will hinder the muscle from coming out if you put tape all the way around, but tape is by far the best support if you don't put it on too tight. If you do, then you do more harm than good. If you put tape on too tight you produce prolonged constriction, permanently. So, again I say it is a question of putting it on right.

However, when the injury is fresh, what you want is rest. You want that tissue back in its place, and you want to hold it there. You don't want it to "give" and pump every time the man moves. If the fibers are torn you want them placed together and held there. That can best be done by tape. Furthermore, when the muscle comes to rest in its smallest size, the tape doesn't suck, and the circulation is freer. So tape, properly put on, is by far the ideal thing for the fresh injuries, but you must know how to put it on.

After the tissue has rebuilt itself so that it has a little strength and you want a little play to prevent the adhesion just talked about, then the elastic bandage is by far the best thing. You can give the muscle a little more play room as you go along. It is by that gradual stepping up that you will eliminate the adhesions. As to how you should treat it, must depend on how bad the injury was in the first place. Don't get the impression that you have only a pulled muscle. Do not think that because you treated a pulled muscle once and it succeeded, therefore all such cases should respond alike. It is all a question of degree,--how severe was the tear. If a man gets hit in the head, the question is how hard was he hit and where was he hit. Similarly: where is the muscle torn, and how severe is the tear?

QUESTION: After the injury has had a period of rest, you don't believe support adds anything so far as the recurrence of the injury is concerned or the ability to use the muscle?

DR. BENSON: At the age the individual plays football or runs in track, he recovers rapidly from injuries. If that injury is properly treated it will be as strong as ever.

MR. ROBERTSON: Do you believe in massage for that type of injury?

DR. BENSON: Yes, if you know what massage is and how

to give it. DR. BENSON: Do you mean the fatty tissue would make

MR. METCALF: Is there any ground for the theory that a muscle which has recently been stretched is liable to be pulled through violent contraction? Is there any ground physiologically for the theory that the stretching as part of the warming up is a preventive to pulled muscles? If the muscle has recently been stretched, is it going to be less likely to be injured by exertion?

DR. BENSON: The only reason for that would be that any manipulation which you apply to the muscle will increase its circulation, and stretching is one such manipulation. I presume that from such a point of view the muscle will become less turgid--more limbered up, and warmer from the increased circulation,--and from that it seems logical to conclude that it would stand a greater strain before breaking.

MR. ROBERTSON: Do you think there is anything in the theory that the overtraining of these muscles--too much sprinting--causes this condition? Do you think that is caused by the lack of lubrication?

DR. BENSON: Well, the lubrication, you know, is just common body mucus. I am not so sure on that overtraining problem. Unquestionably, a man can be worked--overworked--to such a degree that his muscles could not stand up against a pull they could under normal conditions, but one must also consider that the over-worked individual is probably not able to apply the force he could under normal physiological conditions. If an untrained man is put through the same kind of exercise as a trained man, I don't see why he should pull a muscle more quickly than a trained man. The untrained man's muscle may be weaker, but neither can the man apply the same power to the muscle as can the trained man, and he could consequently not perform the same exercise as the trained man. But in both cases, in case of pulled muscles, it would merely be a case of the applications of more power than the tissue could stand up against.

MR. TEMPLETON: A muscle that is undeveloped is pretty flabby. There is a lot of flabby tissue in it. What would you think of the theory that after that muscle had been thoroughly developed so that there was no fatty tissues whatsoever, that that took away considerable protection and left the muscle more brittle, more susceptible to injury?

DR. BENSON: Why would it be more brittle?

MR. TEMPLETON: I don't know. I am asking. It certainly hasn't got the fatty tissues left in there.

DR. BENSON: Therefore, per unit diameter it would be stronger than before. The fatty tissues do not strengthen the muscle, but again it is a question of degree, of how much fat there is. A definite answer is therefore impossible.

MR. TEMPLETON: It would be stronger for some purposes. Would it hold together better?

DR. BENSON: Do you mean the fatty tissue would make it stronger?

MR. TEMPLETON: No, but less susceptible to injury.

DR. BENSON: Yes, you are right, it would be less susceptible to injury from a blow because the fat would form a cushion, but it certainly would not be better protection for a strain exerted by the muscle itself. I don't see any logic in that at all.

MR. TEMPLETON: There is very little logic to a pulled muscle once you get one.

DR. BENSON: There is a lot of logic to it. You are putting more strain on the muscle than it can stand, and the muscle snaps.

MR. HAMILTON: The logic in that is that as a man reduces the fatty substance on his legs, he runs faster, and as he runs faster he puts more strain on his legs and gets in better condition. The faster you run, the more apt you are to pull a muscle. The closer you get to the ultimate of the muscle's ability, the more apt you are to snap something.

MR. TEMPLETON: That seemed to me to be obvious, but I don't know why.

QUESTION: How many coaches feel their muscle strain or tear comes during the height of the season when a man is overtrained? I was of the opinion that ninety per cent of our muscle tears come at the start of the season when you are just starting training, not at the end of the season.

MR. NICHOLSON: Every time I think I know something about them I find something I don't know. I do know they come because of three reasons: First, getting a man in shape too quickly; second, not warming up enough; third, beginning to do a little bit too much work and the muscle tone is going out and they are getting stale. That is my own view. It depends a great deal upon the feel of the boy's legs. You can feel them and listen to what he tells you about their tiredness, and that might give you warning.

MR. TEMPLETON: I find that when a man is starting to get in his best shape, that is the time to look out.

MR. JOHNSON: That is what I have always found.

MR. TEMPLETON: An early season, cold weather, and all that don't seem to have any bad results.

MR. HAMILTON: I think we would like to hear the history of Ben Eastman's pulled muscle (1933), or whatever it was, and how he was treated and how he has come back.

MR. TEMPLETON: Ben never felt anything in his legs, and he is not the type you would ordinarily figure would pull a muscle. The day he did it he was not running in the time trials. I think as a consequence, his muscles were not tensed enough. He was just in there taking it easy, trying to pull out Blackman. He got it within thirty yards of the start, just after he had straightened up. He never could start fast enough to pull a muscle. Just as he got into his stride, and without attempting to make any speed, he

pulled the muscle. He was put to bed immediately and kept there for a couple of weeks.

MR. ROBERTSON: A muscle pulls when you start to put your leg out straight.

MR. SCHULTE: I think it results from a cramp.

MR. JOHNSON: Let us go ahead and get the rest of this Eastman case.

MR. TEMPLETON: We couldn't get any running out of him at all until the week before the I.C.A.A.A.A. It was pitiful, but he was captain of the team and we brought him east. The injury had occurred about six weeks before that. (The week before our California meet). In the trial at Boston he looked pitiful. I pulled him out of the finals. I told him I was going to do that. Tom Keene (Syracuse) was having dinner with me when I told Ben he couldn't run the next day. Ben said, "Please let me run." I just couldn't see that fellow, as good as he was, battling for last place. Tom said, "What do you think you have to say about it anyway? It is none of your business. If this boy wants to run, why don't you keep your face out of it?" I said, "All right, you can run tomorrow." He was pretty pitiful. He led the pack going into the stretch, and then he wilted terribly.

MR. JOHNSON: He ran how fast?

MR. TEMPLETON: I think it was won in 1:54. Ben, I believe, was fifth. He was probably fifteen yards behind all of which he lost in the stretch. Then he laid off until along in the next season. He was very much afraid of that muscle. He could feel it, or so he thought. What he could feel was scar tissue in there. He developed a limp by habit, and it is only recently that he has got over it. Now in his training this year, after laying off for a complete year, he has had it in the back of his head all the time that he has to lay off speed in order to take no chance on that muscle. As a consequence, he has no speed at all. At his best he couldn't break 49 in a quarter. He has developed quite a bit of stamina. However, he still can't finish. He looked like an old wash woman coming in the other day, but he ran 1:50.5. That muscle is absolutely healed and he can't feel it, and the scar tissue is dissolved and he should have been out there running for speed.

MR. JOHNSON: Haven't we spent enough time on pulled muscles?

MR. TEMPLETON: You could spend the next five years on that subject and it wouldn't do any good.

QUESTION: I believe I agree with Mr. Robertson on overwork. There is a certain school in our conference that I have studied for five years. Every year they have from two to three good sprinters and other men who pull muscles. I have tried to study the reason for it. I have asked the

boys how much they worked. From talking with them, I thought they worked too much. They had three good sprinters this year, but they tried to run them too quickly again. I saw them break down again. I have one boy who pulled a muscle on May 8, and he will run here tomorrow (June 19). I rested him one month. I want to see what he can do.

MR. NICHOLSON: He probably will not hurt himself.

QUESTION: I believe a lot of it comes from overwork.

MR. TEMPLETON: I do know of one specific cause for pulling muscles, and that is when a runner who is going at complete speed suddenly decides to let up and relaxes completely. His speed is so great that the relaxed muscles simply won't hold him. It may be right at the tape, or if he sees he is beaten, or it may be just before the tape. I have seen any number of instances of that.

MR. NICHOLSON: I had a boy who was just the opposite in the Central Conference Meet. We were staggering the quarter around the first turn. Just as he was about to come off the first turn, he saw he was behind and gave a spurt and pulled the muscle.

MR. JOHNSON: I don't believe we are really warranted in spending much more time on pulled muscles. Are there any other questions that you would like to put to this panel regarding any of the aspects of conditioning?

MR. NICHOLSON: Do you want to talk about Billy Hayes' success in the mile and two mile and the unorthodox way he is doing it by running a man a mile?

MR. JOHNSON: That is a matter that would not come up in this consideration of conditioning. Under some of the specific applications of conditioning, it might be considered. We gave a lot of time to distance running last year. Have we any more, then, to talk about as to this matter of training?

MR. TEMPLETON: I think that one point is about as important a matter in conditioning as was brought up. I want to hear about burning them out and going stale.

MR. NICHOLSON: Those Indiana boys aren't going stale; they are getting good.

MR. JOHNSON: Who can tell about that, outside of Billy Hayes himself?

MR. HAMILTON: He gave his outline of work last year at the coaches' meeting. Two things struck me about it. One of them was that he worked his boys terrifically hard all during the year. Another thing was that he knew exactly what he was doing all the time. The boys thrived on it and liked it. He scheduled his work. I don't think any of us have here the notes from last year's meeting, but some of you can recall how he worked them, fighting all the time to overcome fatigue. He, of course, is the kind of man the boys like very much and they work awfully hard for him and enjoy working for him.

MR. NICHOLSON: I have competed against him in the state meet for nine years, and we have won many track meets from him, but I haven't won a mile and a two mile yet. He is a better coach of milers and two milers than I am.

MR. JOHNSON: We have a copy of the notes from last year here, but I don't think we want to go over them in this particular discussion. We can talk about those in the open forum which we shall have in just a short time. If that is all we have to say about conditioning, I will thank this panel for sitting here. I think we owe Dr. Benson a vote of appreciation for taking his time away from some important work at the hospital to come over and tell us his ideas about these injuries and these other things which he has discussed.

QUESTION: I wonder if he could take up diet for a minute.

MR. JOHNSON: I think that is an important part of training and conditioning. Would you care to talk about that, or isn't that in your particular line, Dr. Benson?

DR. BENSON: I can give you very briefly my opinion of diet and you can take it for what it is worth. My opinion of diet in general is that every man has certain idiosyncrasies, and that there can be no set rule in diet. That is the first thing. There is no set rule that will fit everybody. There are some things on which I don't agree with Mr. Stagg, for example, and I can say that now since he is not my boss any more. But more than that, for I certainly feel that any system pursued by Mr. Stagg certainly is not a harmful one, or he would have discovered it long ago. My point is this, that there is no one set system which can be definitely said to be the best. Take, for example, the question of drinking milk. Mr. Stagg permits one glass of milk, or probably no more than two glasses of milk, on the day of the game.

MR. STAGG: I didn't want them to use the milk immediately before the race.

DR. BENSON: I think Mr. Shaughnessy, for example, says, in general training they can drink all the milk they want. In the first season the boys tried to see how much milk they could drink. Of course, it was a question of overeating, and there was a reaction. Personally, I don't see why milk should be any more objectionable than any other kind of food, except with some individuals who can't take it. Milk is supposed to be the best food we have. Physiologically I don't see why it should be objected to, but if it doesn't agree with you, there is only one sensible thing to do, and that is to let it alone.

Also, Mr. Stagg didn't permit any coffee. I certainly do not speak for coffee, but if a player has had coffee

DR. BENSON: I know a wrestler who used to eat a half bucket of oatmeal a half hour before every match he had, but those are extremes.

all his life and then feels poorly because he doesn't get it, I would prefer to let him have it. I don't think Mr. Stagg agrees with me on that, but that is my own opinion. That the cup of coffee wouldn't do him any harm.

My advice on diet in general is to eat a great variety of food and those combinations of food which the individual has found he likes and that agree with him the best. I am not able to prescribe anything definite. I say a great variety of food and a fair amount. Then consult with the individual about the things he doesn't like or the things that don't agree with him. For instance, we had some football players who couldn't eat eggs.

QUESTION: You don't believe, then, you should take your team into the dining room and say to the head waiter, "I want roast beef and boiled potatoes and spinach for this outfit today"?

DR. BENSON: No, I do not, unless you know that each and every man on your squad likes and thrives on such a dish. I say there are certain limits in diet that are obvious, but within those limits I would allow all the wide variation possible. An absurd extreme in feeding would be, for example, to give a man a fat steak just before a race, fat being the slowest digesting food we have. Of course, greens are all right, but some people don't like them. Aside from such general limits, I don't see on what physiological basis you are going to prescribe food for the whole team. My advice on diet would be this: avoid obvious absurd extremes such as feeding fatty food before a meet. Next, ascertain the food--likes-dislikes-and idiosyncrasies--of each member of your squad, and then pay more attention to seeing that no player is given food he doesn't like, than to seeing that every player is fed nothing but some food you may think he ought to have.

MR. TEMPLETON: On most campuses they eat what they get, and a lot of them are lucky to get anything.

DR. BENSON: On a trip, for example, we always ordered within certain limits. Some boys were able to eat three times as much as they got but we controlled it. Within reasonable limits the individual is his own judge. I had a team in basketball at one time. They wouldn't listen to anything. One time we went out for a game, and they ordered some pork chops about an hour and a half before the game. I didn't say anything, I let them go to it. Their experience with the pork chops was enough. From then on they laid off them. From then on they would listen to reason.

MR. SCHULTE: I had a quarter miler one day who ate hamburger and pickles. He deposited them after the quarter. The miler, however, ate fried eggs and sausages before the mile and he ran the best mile he ever ran in his life and felt like a rosebud afterward.

DR. BENSON: I know a wrestler who used to eat a half bucket of oatmeal a half hour before every match he had, but those are extremes.

MR. STAGG: A man of ours ran a race once. He ate a veal pie before the race, but he stopped in the middle of the race.

May I speak on the other side of this coffee matter? When I was at Springfield College they showed that coffee was not a food except if you had sugar and milk in it. Also that study showed that coffee had a poison in it, and in general I am against poisons. If it were for no other reason, I would say, "You had better eat food, boys." I haven't been so particular about the thing. I am particular about one matter, namely, that the boys will be equal to making some sacrifices. I care more for that sort of thing than I do for the particular kinds of foods they have.

Unless you can get a fellow who is willing to make sacrifices, even though those sacrifices may be unimportant in a sense in reference to the result, you don't get, in my opinion, the psychological and spiritual result out of the men that you would otherwise get. I am perfectly willing to say that a fellow might smoke in certain instances and produce just as good results, but I would be against the smoking because I want the boy to make the sacrifice from the spiritual standpoint, and I think in general you get better results when you can get that out of the boys.

MR. JOHNSON. I agree heartily, and I think everyone else does. To me this aspect of training is vitally important. Have we any more specific questions on diet that we want to put to Dr. Benson before we conclude this discussion of training?

MR. STAGG: I should like to ask him one question in reference to tendon sheaths--inflammation of the tendon sheaths. Is there any prevention for that? Is there any cure other than rest and gradual heat? It takes some time to produce it. That is not so common as the pulled muscle, but every now and then I hear of one. I think Brutus Hamilton had a man this year who had some trouble of that kind.

MR. HAMILTON: They tried many kinds of treatment but it was to no avail. The boy could walk without any pain whatever. In the ordinary walks of life it didn't bother him at all, but the instant he got up on his toes to run, it wouldn't work.

QUESTION. Did it start from wearing low heels?

MR. HAMILTON: No, he got a kick in a sophomore brawl. It set up some kind of growth that we never were able to cure.

MR. JOHNSON: Can you throw any light on that subject, Dr. Benson?

DR. BENSON: I have to go back to my general theory again. I don't know of any injury that can be cured without rest. That is the primary therapeutic application you have--heat and rest--except, of course, if there has been a complete separation of any tissue or the sheath.

It must be put back in place, and that, of course, can be done by placing the person in such a position that the two torn ends are brought in contact. Then you must have rest until the connection is made or there has been regeneration. Then you apply heat and gradual massage and gradual exercise.

If it had been brought into proper position after it was first ripped, and held there for twenty-four or forty-eight hours until the healing process had started and then slowly heated and very lightly massaged, undoubtedly it would have held. I see no reason why it would not have held. Any other part of the body heals if it is given a chance. View it as an open wound. If you don't stitch it together you have a big gap there which will fill up with scar tissue. I don't know of any other method except bringing the torn parts back into their normal position and letting them heal, all of which can be aided by heat and massage. This brings me to this heat problem which I will take a couple of minutes to give my opinion on.

How do you treat them? I don't know. My own suggestion is that the best kind of heat you have, especially for sprained ankles and injuries that are not too deep, is hot water. As far as diathermia is concerned for increasing the flexibility of a stiff joint, it does not do it. Often it produces more rigidity. Hot air will give the greatest increase in flexibility if you apply it for an hour or more. If you haven't a whirlpool in your training quarters, you ought to make one right away. It is the best and most effective and the cheapest applicator in your training quarters for treating athletic injuries. It doesn't cost much. You can make one yourself for \$15 or \$20. It costs about \$150 if you buy it.

Then radiant heat is very fine. As for short wave machines etc. I suggest you wait until they have had a longer trial in competent hands. If you want to apply moist heat to the back or shoulder etc. put on a hot wet compress and then put an infra red lamp above the wet compress and you have thus a hot moist application. You can control the temperature of this kind of a compress by varying the distance of the lamp from the compress. One difficulty with electric machines is that most men don't know how to use them. I tried them enough though to know they are not nearly as effective in most cases as hot water and hot air and radiant heat. The whirlpool is the one thing you should have.

MR. JOHNSON: We have time for one more question on training. Mr. Moore has a question.

* See report in QUARTERLY RESEARCH, December 1930.

Relative Influence of Diathermy and Other Physical Therapy Measures on Stiffened Joints.

MR. MOORE: I should like to ask a question of the coaches rather than of the doctor. I should like to know what place in a system of conditioning men a vigorous program of calisthenics has. I see some coaches giving from five to twenty minutes a day of vigorous calisthenics along with all the other hard work they give. I wonder if anybody has any ideas on that and what place you think that has in the conditioning of men, both football and track.

MR. JOHNSON: I use calisthenics at the beginning of a practice session for everybody who will take the time to do it. We don't do it for more than ten minutes. The whole object in going through any calisthenic exercise that I prescribe is to give them the stretching that a good many of these people agree helps as an injury preventive. Any calisthenics that your men do is for nothing more than a stretching of all the muscles that they will use. That is, briefly, our calisthenics program.

MR. NICHOLSON: I use calisthenics partly as a conditioner and partly as a method of getting my men under control. If you call them up and give them a calisthenic drill, you more or less have the idea of a drill and you can give them information in handling big numbers of men which helps wonderfully, and it has a tendency to further discipline. I really do believe it helps a lot in the early season, but as the season goes on and on, you can at least cut down the amount of it. I think some of it should be done, because I think the average boy doesn't warm up enough, and if you give some of these exercises which are of a warming up nature, you get them warmed up better. I don't think they can do that in the regular season because I think it takes something out of them.

MR. JOHNSON: We don't have a calisthenic drill. Each man is supposed to go through a stretching exercise. George, (Mr. Gauthier, Ohio Wesleyan) are you trying to get out of something? I never saw anybody do any more stretching exercises than your boys used to do eight or ten years ago.

MR. GAUTHIER: We still do it for, perhaps, the same reason you explained, and because I feel in the early season, as Mr. Nicholson said, it helps in the general development of muscles and parts of the body that they may not be using in that particular sport--just for general development. We still use it in all our sports.

MR. JOHNSON. I might add that that is where I got the idea of using these stretching exercises--seeing those hotshots from Ohio Wesleyan go through their capers in preparation for competition. They could run.

MR. TEMPLETON: The high kick and bending exercises are very beneficial not only for a warm-up but also for actually limbering a man. Many men around college age have never bent over and can't come close to touching the floor.

something like 135 this year.

Simply by doing it a few times a day for two or three months they can get their whole hands on the floor. Then they will be that much more limber and it is a benefit to them in any kind of athletics. High kicking is on the same order. It stretches the muscles in the back of the leg particularly and makes them very much more limber and pliable. To that extent, bending and high kicking are not only a warm-up, but they are actually a developer.

The other exercises that I use are those which develop the stomach--lying on the back, raising the legs slowly, circling them, and sitting up. You find a number of kids who can't do that at all at first, but within a very short time their stomach muscles become very hardened. I think it is the easiest way of getting the stomach muscles in shape. They also are a very good developer of muscles of the buttocks. To my mind, the muscles of the buttocks and of the stomach are the absolute foundation of any athlete, and there are new exercises that we have which are particularly designed to hit them.

MR. JOHNSON: I think we had better call a halt to our discussion of training. I would like to continue it, but we must go on to other things.

We have on the program a brief consideration of rules, which will be led by Mr. Metcalf. Following that we shall have a brief business meeting and the election of officers, unless you want to have an open forum discussion of any other subjects. Mr. Metcalf, will you talk about proposed changes in the rules?

... Remarks by Mr. Metcalf were omitted from the record at the direction of President Johnson with the explanation that those changes which might be voted by the N.C.A.A. Rules Committee would be included in the 1937 Rule Book. Following this discussion of rules and recent improvements in eligibility, recommendations were voted as follows: (1) that this body go on record as urging the adoption by the International Federation of the use of starting blocks. (2) That the metal vaulting pole be likewise so legalized, if now illegal. (3) That the all metal javelin and discus be likewise legalized if specifications for such implements are met. (4) That the use of our standard hurdle be also made legal with no penalty attached for knocking over 3 or any number, and recognized whether or not a hurdle is hit.

BUSINESS MEETING

MR. JOHNSON: Let us close our meeting with these business items. I have no formal report to make as President except that I think this organization is really getting on its feet. I made a remark this morning that we have a total of \$81.15 in the treasury just now, which is more than we have had since the inception of the Association in 1930. We increased our membership this year over last by about fifty per cent. We had about ninety members last year. We have something like 135 this year.

You will receive, as usual, a copy of the mimeographed notes of our proceedings.

The report of the Treasurer lists briefly receipts amounting to \$153.85, and disbursements of \$72.70, leaving the balance that I mentioned, \$81.15. I am assuming this report will be accepted by this group.

May we now have the report of the Nominations Committee? Following that report we shall have the election of the three officers instead of four, as in the past. The offices of Secretary and Treasurer were combined by a vote of this group this morning. We shall also have have an Advisory Council of the Association, nominations for which will be made by the Nominations Committee. Mr. Fetzner, may we have your report?

MR. FETZER: Gentlemen: At a meeting of the Nominations Committee this morning, the following list of officers was proposed to be submitted to you for your approval or disapproval. In presenting this report, I think possibly a brief explanation might be in order. The Nominations Committee felt that due to the progress that had been made in our Association and due to the steps that had already been taken with the idea of welding and amalgamating the Association with the other track coaches associations, it was more or less of a critical year, and with that in mind the Committee have selected officers who, in their opinion, could best carry out and further this development.

The nominations are as follows:

President F. P. Johnson (Drake)
Vice-President Frank Potts (Colorado)
Secretary-Treas. Ward Haylett (Kansas State)

Advisory Council (One year)
Carl Olsen (Pittsburgh)
Wilbur Hutsell (Auburn)

Advisory Council (Two years)
E. C. Hayes (Indiana)
Ralph Young (Michigan State)

Advisory Council (Three years)
Henry Schulte (Nebraska)
Dean Cromwell (Southern California)

MR. BRESNAHAN: I move the adoption of the report of the Nominations Committee.

MR. GAUTHIER: I second the motion.

...Mr. Fetzner assumed the Chair...

MR. FETZER: I propose to ask for further nominations. If there are none, we shall vote on the motion which is before you.